

THE PAGEANT OF MEDICINE

THE PAGEANT OF MEDICINE

FELIX MÁRTI-IBÁÑEZ, M.D., *Editor*

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Preface: Man and Medicine



Man dreams, and if he advances confidently, as Goethe recommended, in the direction of his dreams—which are but passionate presentiments of the faculties latent within him—he sometimes realizes them. *MD*, the medical newsmagazine, the best articles of which are now collected in this volume, represents the crystallization of a dream: to embroider with the pages of a magazine a vast polychrome tapestry depicting the cultural panorama of the Medicine of our times.

All human endeavor, be it the building of a cathedral or the creation of a magazine like *MD*, when genuine and sincere, carries within it a fragment of a man's soul, of his imagination, and of his dreams. In one of my articles, "The Fabric and Creation of a Dream," included in this book (see page 3), I relate how, many years ago and many miles away, beyond the leaden waters of the Atlantic, in full view of the azure Mediterranean, I dreamed of founding a magazine that would encompass within the same covers the three personalities—human, professional, and social—and the three circles of activity—medical, cultural, and spiritual—of the physician.

This idea was born when I had not even completed my medical studies and my dreams were far greater than my knowledge of life. Many years, rich in action and struggle, were to pass before I

finally launched this magazine in January, 1957. And magnificent indeed has been the physicians' response to the appeal made to their intellect, their spirit, and their curiosity. Thanks to them, an enterprise, which was quixotic in its seeming impracticability, defying and breaking all the established principles of the publishing business and filling only with ideas, faith, and enthusiasm the lack of everything else—thanks to them, *MD* met with a dramatic success, becoming in little more than one year the beloved companion of the American physician, his family, and his staff. Thus it was proved that history is made, not by businessmen with a cautious mind, but by men with imagination and courage.

In my editorials in this book, the curious reader will find the philosophical principles, the techniques, and the horizons of this magazine, whose ideal is to serve the interests of American medical culture. There we explain the philosophy on which the fabric of *MD* was embroidered, and also some of the editorial secrets that enable us, with the aid of pen, charcoal, and camera, to turn the most prosaic or technical subject into a polychrome tapestry. More than a magazine, *MD* is today a flying carpet piloted by a team of writers, artists, and technicians in the service of universal medicine and culture.

Many of our colleagues have repeatedly requested not only that we publish in book form a selection of *MD* articles, but also that we make it available to the public, and thus create a bridge of understanding between layman and physician. We were once more deeply moved by this new proof of our colleagues' interest in our publication and very gladly have complied with their request by gathering in this book, slightly modified and grouped in sections to make them easier to understand, a selection of those articles that we believe hold the most interest for both the medical and the lay reader.

The reader, of course, will be kind enough to remember that the articles contained herein were not intended for the restful, serene pages of a book, but for the nervous, vibrant pages of a magazine, whose contents in form, depth, representation, and even typography were oriented for busy, hurried physicians, who do their reading in the moments they can snatch between patients or at home at the end of an exhausting day. Hence, *MD's* prose is light

and nimble, lean and nervous, a veritable shorthand of ideas and concepts, which the physician's busy mind can grasp quickly, but it is always attentive to that accuracy of data and figures that are indispensable in medical practice.

It has been necessary, furthermore, to eliminate the illustrations that appeared with the articles originally. The magic of an ancient print, a rare lithograph, a journalistic photograph, a scientific diagram, a little-known chart, a revealing portrait or sketch, which so effectively complemented the spirit and contents of the original articles—these, we hope, the kind new reader, who does not have the opportunity of referring to our magazine, will please see in his mind's eye, where now only the phantasmagorical imagery of the printed word remains.

And now I would like to mention, with gratitude, admiration, and affection, my devoted collaborators, the "bewitchers of the night," whose genius and ingenuity have made it possible to mold my dream into a reality. The names of those others who also participate in the production of this magazine are listed elsewhere in this book, but here I wish to pay special tribute to that loyal and brilliant associate and friend, Dr. Michael Fry, Managing Editor, who has edited these articles; to our dynamic News Editor, Walter Schneir; to those talented writers Ruth Goode, William F. Dial, Donovan Fitzpatrick, George W. Groh, Bernard Magil, and Naomi Pfeiffer; and to our indefatigable researchers and expert special contributors, all of whom, with an enthusiasm equaled only by their skill, have made it possible to make of *MD* a magazine moved by a mission and bearing a message.

Modern medicine adopts the methods of the natural sciences, but in objectives it is a *social* science. The physician is no longer only a healer; today he is also an organizer, a "knower," and, above all, a preventer of disease. If medicine is to become a science that not only prevents disease, but also promotes health, it is indispensable that there be close collaboration between physicians and patients, and especially between physicians and well people, so that together they may create a healthy, happy society. This goal demands a greater communication between physicians and other members of society, a constant interchange of cultural interests, concepts, and ideas. It also requires that it be clearly

understood that the role of the physician today is far larger than that of the family doctor of yesteryear, extending into such areas, to all appearances remote from medicine, as art, sports travel, religion, literature, politics, economics, and technology

This book, which is a window opening on the ever-widening world of the physician, seeks to answer our good colleagues' desire to have everyone become identified with the ideals, obligations, and achievements of Medicine. For this is the best way of enlisting everybody's help in the great crusade that one day will transform *Medicine from a science devoted to combating pain and death into an art devoted to promoting health and happiness*

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I | THE MD CONCEPT

The Fabric and Creation of a Dream



I. THE SYMBOL OF THE SAILBOAT

I want to tell you the story of the medical newsmagazine *MD*. A magazine, like a sailboat, requires the concerted action of three elements to be able to navigate. The sailboat needs wind to propel its sails, a blind driving force, without which, however, no motion is possible; a compass to mark its course; and a pilot to combine wind and compass into effective navigation toward the desired port.

Likewise *MD* has a philosophy, which, like the wind to the sailboat, was the force that started it going; a journalistic concept, which, like the compass, marked its literary course; and a team of pilots with a unique editorial technique.

the physician. He is an intellectual, yet, unlike the "pure" intellectual, he is also and above all a man of action, concerned far more with occupation than with *preoccupation*, exactly the opposite of the pure intellectual, whose life is mainly one of preoccupation and whose mind flourishes far more brilliantly the more devoid his life is of action. The physician, luckily, lacks the spiritual apraxia of the pure intellectual. Instead, his life is constantly shaken by swift vibrant professional reflexes. Yet, as an intellectual, the physician perforce has intellectual needs that his time-consuming work does not allow him to satisfy. He is thus forced to anesthetize his inner vocations, to stifle his intellectual yearnings, to let his artistic gifts grow rusty, to hurry in his daily work his "unlived lives." The physician often lives in an enclosure of mirrored walls that reflect only the never changing images of his professional interests; yet what he really needs is not mirrors but wide-open windows, allowing him to see the sweeping vistas that stretch beyond his office or hospital.

Thus began my dream of integrating the lived and "unlived" lives of the physician, of wedding his three personalities—as a human being, as a professional, as a member of society—into one single concept, consisting basically in adopting a *total perspective* of people, things, and world events, and of that living history we call "our times."

Such was my dream. The years passed. Tragic events in my native country drove me to strange lands. The urgency of mere living prevailed. But my dream was never forgotten. Like a restless little bee it continued to assail me from the deep recesses of my mind. Even as I performed my duties of the moment, I mentally worked out my concept, and slowly it evolved through the years of adaptation to a new country, a new people, and a new language.

and the artist were originally one and the same person and that art and medicine were carved from the same quarry of civilization.

Yes, to bring my concept home to physicians, *communication* with them on the widest scale possible was imperative. The most important moment in creating is possibly the moment of communication. Only when a work passes from one mind to another does it become a work of art.

Communication, furthermore, had to be done with "a judicious amount of levity," a decision prompted by the psychology of my native people, with whom persuasion must always be preceded by a little seduction. To put across the exactness of an idea, it is indispensable to express it with a certain undefinable charm, that magic quality that bullfighters call *garbo*. Unquestionably, a magazine expressing a concept like mine had to be done with charm and humor, or it would turn out to be—to borrow Brillat-Savarin's description of a wonderful meal without cheese—like a beautiful woman with only one eye.

And thus it was that MD was born.

The "Bewitchers of the Night"

The next step in my musings was how this concept of integrating medicine, society, and humanity was to be translated editorially into a magazine of medical culture and cultural medicine.

I then recalled that in old Canton there once abounded a type of magician called "bewitchers of the night," who, with the help of lanterns and Bengal lights, cymbal music, burning incense, sweet nectars, and balls of jade, which spectators were asked to rub between their fingers, played on the five human senses until they succeeded in casting their audience into a dream world that turned an ordinary evening into a *night of fantasy and revelry*. But, barring the fleeting sensation, so pleasant to some, of the touch of paper, the smell of ink, and the rustle of pages, a magazine can only appeal to one sense, the visual, and to do this it disposes of only two tools, words and images, which in medical journals have always been technical and factual, since scientific prose, like a greyhound, should have only lean flesh and quick bones, this being adequate enough for conveying information, but certainly not for bewitching anyone. And MD had to "bewitch the

night" of the physician, opening for him the treasure chest of life, conjuring around him with words and images a polychrome screen of Coromandel.

Words and Images

This, I decided, could be done with three things. First, with an original approach to the people, ideas, and events that would parade through the pages of *MD*. And what could be better than an approach that combined both the past and the living philosophy and *history* of medicine, in order to attain a perspective in time of the subject dealt with, and *geography* in order to add to that a perspective in space. Second, with colorful *words*, a luminous style unafraid of metaphors or paradoxes, rich in humor and color, in salt and sun. The language of science, like the distant stars, sheds frosty light but not warmth. *MD* had to shed both the light and the warmth of the flame. And third, with captivating *images*, revealing the strange in the familiar, the exotic in the commonplace, relating it to time and space, to its historical roots and to people and things from exotic distant times and lands.

Presentation of subjects, therefore, would be approached with such tools and would be developed using the same technique that is used by a storyteller to enthrall his audience, whether he be a ragged spinner of yarns in the Zoco Chico of Tangier or a sleek raconteur in a theatre of the Champs Elysées.

Greatness and Romance

Greatness in its editorial policy was another longing of *MD*. The longing to be great, not big but great, is one of the noblest human aspirations. There is greatness in the yearning to do things, to translate dynamic ideas into daring deeds that may have a salutary influence on the life of many people, and in doing this with simplicity, for greatness is simplicity.

To *MD*'s longing for greatness was added the desire to restore to medicine some of its old romanticism. We should not be ashamed of being romantic, for, since a romantic is a man whose heart has gone to his head, only by letting our hearts go to our heads can we perceive that the world is filled with beauty. There is no romanticism in things themselves, but in *how* we do them; not in the world itself, but in how we *look* at the world.

Today we live in a perennial haste that turns men and things into robot-like creatures in an endless frantic procession, reminding of the telegraph poles that whiz past the windows of an express train. Romanticism consists in halting in front of people and things, in detaching them for a moment from the group and seeking out their inner music and color. The mere act of setting a single person or thing apart from the crowd, even as a fine florist displays a single rose or a good jeweler a single gem, invests that object with a singular charm.

Thus, I thought, *MD* should be focused, restoring drama and poetry to medicine, transforming what seemed a prosaic task into an epic saga, the seemingly mechanized professional man into a quixotic crusader, and his apparently materialistic aims into the quest for a Holy Grail.

Courage Against Statistics

The dream was now fully developed, but life, always slower than dreams, delayed fulfillment for many years. And then came the day when *MD* was finally launched. Allow me to say that it was an act of poetic courage. For the unanimous opinion was that the editorial principles of *MD* foredoomed it to failure. Everyone I consulted—publishers and businessmen alike, bless their souls!—made the same reply. *MD* could not succeed. Its spirit was "too romantic," its character "contrary to what the American physician needed and wanted to read." The enormous rate of failure and mortality among magazines in this country, even of an eminently practical nature, was statistically demonstrated to me. In fact, they were all as negative as those people who specialize in ordering from a restaurant menu the only dish that is not available.

Fortunately, the flood of negative statistics only served to strengthen my positive decision. For—I admit it—all my life I have felt an unconquerable shyness toward statistics. They are necessary, I know, and as a physician I have often used them, but always with the same distaste with which I use an umbrella on a rainy day. Statistics are useful for confirming something, but they must never rule the making of a decision. Had statistics been the deciding factor in the chances of success of many a visionary enterprise, the pyramids would never have been built, America

discovered, *Don Quixote* written, antibiotics developed, or rockets launched to the moon. Statistics will never take the place of the strength of a decision founded on the power of an idea.

If all this is romantic, then let no one say that American physicians are not romantic. For their reception of MD could not have been more affectionate or enthusiastic. For over three years now they have unstintingly given MD their warmest praises. Thanks to their great humanistic sense and to their kind encouragement of head and heart, the dream of a medical student in Spain has been fulfilled in their bountiful and generous land.

III. THE MD CONCEPT

The MD concept, therefore, is to help the physician satisfy his innate curiosity in the vast, rich tapestry of medicine *and of life*.

For a physician is not only a professional, interested exclusively in science and the art of healing; he is also an individual who feels the need to increase his cultural knowledge, and a member of society who, besides health problems, wants to understand also the political, economic, and sociologic problems of his community, his country, and the world at large. The physician who thinks that he knows all about disease because he knows medicine is as presumptuous as he who thinks that he knows all about the fires of Hell because he knows all about matches. A physician is not only a social person; he is also a *historical* person. He must be not only an individual but also a *person*, that is, an individual as an active factor of society, even as a people are a nation only when they are an active factor of universality. The interests of the world, therefore, are his interests.

The physician's mind is often like a series of rooms filled with knowledge but lacking communication among themselves. MD attempts to link the diversified knowledge in the modern medical mind as a corridor in a hospital links all rooms without interfering with their privacy.

The Need for History

Whichever may be the "royal road" of medicine chosen by the physician—practice, research, teaching—he must have a thorough knowledge of the history of the world and of the society in which he lives, and he must also know the links between the past and

his present duties. For without history nothing has a full meaning. Proof of the value of this historical approach is that the most important medical document has always been the clinical case *history*, whether of unusual or ordinary cases, that "small change" of medicine which constitutes the real capital of the physician's experience.

History is vital, for everything of importance was already said by the Greek philosophers over two thousand years ago. No wonder a "secret Greece" beats in the heart of all men! To what the Greeks said about the awakening of man's conscience, the nature of the universe, and the dignity of man, we can only add the results of scientific research, the achievements of art, and the records of history.

Against the excessive current specialization, *MD* also endeavors to stimulate all those "reserve" occupations—writing, gardening, art, chess, sports, or travel—without which the physician, slaving at his professional occupation, would become a technical automaton. Even as the organic reserves of fat and sugar protect the body against the dangers of fasting, reserve occupations help the physician to protect his mind muscles from becoming atrophied.

MD tries to help the physician in that search for wisdom which has been defined, from Spinoza to Will Durant, as a search for a *total perspective*, that is, a universal vision, integrated in time and space, of persons, things, and events in view of eternity.

IV. MD'S EDITORIAL TECHNIQUE

Selection and Correlation

Let us now talk about the technique of *MD*.

Our technique is based on maintaining a total perspective when developing each subject, correlating its present aspects, which is *life*, with its dimension in time, which is *history*, and integrating these two components—life and history—into *living history* through the magic of words.

The theme of each article is extensively and objectively studied and interpreted in the light of its correlation with other facts. This is done not only to acquire an exhaustive documentation on each subject, but, above all, to develop original *ideas* on the subject.

MD's chief capital is the wealth of ideas and correlations we establish between the subjects studied and others that seemingly are unrelated.

Countless examples could be adduced to illustrate this thesis. The study of bull fighting reveals that the preponderance of fine *toreros* in Mexico today is related to the frequency of violent revolutions in that country's past, both these activities having a common root in a supreme personal contempt for death, whether of oneself or of another.

The traditional uncomfortable professor's chair in most colleges bears a relation with the uncomfortable royal throne of yesteryear. The chair was a symbol of authority, so much so that rulers used to carry their chairs with them on their travels, just as we today carry our valises. The more uncomfortable the chair, the more stiffly did the king or master sit in it, in court or in class. For rigid immobility was and still is a symbol of authority, in contrast to the informality of a slouched posture, and from the Byzantine icons to our modern sculpture, no statue of a king, a leader, or a master is more impressive than that which shows him rigid, as though holding back his wisdom and power.

in the article, impregnating it subtly with its flavor, just as invisible spices flavor a dish.

The selection of subjects is guided strictly by the criterion that they must above all be interesting, informative, useful, and topical. Of course, by "topical" we also mean universal and historical, for events that occurred hundreds of years ago can be of enormous topical interest today, as, for instance, the "prophecies" of Nostradamus. The current rise of the Oriental nations on the political horizon seems to confirm his alarming prediction made four centuries ago that "before the end of the twentieth century, yellow men will fly over Paris."

Approach to Subject: Life, Environment, Situation, Work, Ideas

Once the subject has been selected, our *approach* to it is then determined. The same subject can be looked at from many different points of view and the reader's satisfaction depends on our choosing the most dramatic one. The important thing is to follow—as our brilliant writers and editors do—Gustave Flaubert's precept: "*Il faut intéresser.*"

Take, for instance, our section devoted to literature. We never follow the usual cradle-to-grave approach in a biography. This is fine when *everything* in a man's life is interesting, but this is rare indeed. For human life, like the soldier's in war, consists of long periods of tedious waiting interpolated between brief moments of intense dramatic action.

Instead, we approach an artist's biography from that angle which appears the most interesting. Sometimes it is his *life*, because it was even more interesting than his work. This is the case with Alexandre Dumas or T. E. Lawrence, whose lives contained even more action than their books.

At other times we focus our article on the *environment* or the place where a man lived, because it had a decisive effect on his work. Such was the case with El Greco, for whom Toledo was not only the canvas on which he painted his pictures, but also his leading theme. Toledo, rising from a gigantic rock against which the romantic and knightly river Tagus sharpens itself like a Toledan sword, provided the inspiration for El Greco's best works. Even

the inmates of Toledo's insane asylums served as models for El Greco's saints.

On occasion we prefer to select a *situation*. For an article on Goethe, I would choose his stay at the court in Weimar, which marks a conflict between his vocation as a writer and his inclinations as a courtier, particularly the masked ball of January 1, 1800, celebrating the dawn of the nineteenth century, at which Goethe appeared crowned as Jupiter Olympus.

For a biography of Pablo Casals, I would choose his first concert, when, scorning the concert halls resplendent with ladies in shimmering satins and diamonds, he preferred to play in the little village of Prades, lost somewhere in the Pyrenees, for a group of destitute exiles and modestly dressed women on whose cheeks sparkled the diamonds of tears far more beautiful than the jewelers' diamonds.

If a man's *life and work* are equally interesting, our approach embraces them both. This would be the case with Cervantes, whose roving life was as interesting as that of his own Don Quixote, or with Vesalius, whose life was as rich in adventures as the "muscle-men" of his *Fabrica* are in drama.

In other cases we find that the important elements in a man's life were his *ideas*. An excellent example is the Spanish philosopher José Ortega y Gasset, who led the sedentary, unchanging life of a professor and writer, yet, while philosophizing amid the magical blue smoke from his cigar, experienced entirely in his mind, like a Marco Polo of the spirit, perhaps the greatest adventure in universality in the twentieth century.

Research

Any theme accepted by *MD* undergoes the most exhaustive research, even though most of the labor done for each article remains buried in our files. Our patient and skillful researchers leave no stone unturned, no possibility untouched, though they know that, like an iceberg, nine tenths of their labors will remain submerged in the files and only the remaining tenth will be visible to all. With the completed bibliographic research in his hands, the writer begins his task.

Literary Cuisine: The Arroz a Banda

There are in each article a thousand invisible ingredients that

impart to it flavor and quality. The brilliant ballet of human life can be interpreted only when all the ingredients that give it color and music are distilled into prose, with no one but the author knowing that they are there. This culinary-like literary process is comparable to that followed in Valencia, Spain, in preparing a rice dish known as *arroz a banda*. This dish borrows freely from the polychrome encyclopedia of the *paella* and the watercolor of the *arroz con pollo*, and winds up being far superior to both. The fish and seafood of the *paella* and the chicken of the *arroz con pollo* are simmered together until they have released all their juices. The rice is then boiled in the rich broth and set on the table without a single morsel of fish or fowl to mar the glossy nudity of the grains of rice. Yet each tiny grain of rice contains all the flavor and essence of the Mediterranean. Similarly, in preparing an article we try to combine the choicest morsels of information with the most imaginative seasoning, so that it may reach the reader free of all pedantry, clad in tasteful simplicity, like a literary *arroz a banda*.

Style

What is the style adopted in *MD*?

Style should be like the spices that season a salad. We like our prose to be simple, yet we are not afraid of images, symbols, contrasts, or metaphors. If dogma, we feel, is the leaden ballast on the wings of theology, metaphor is the tail wind on the wings of science. Nor do we flinch at scientific neologisms, for these are unavoidable in an age when science marches forward with greater speed than the semantic progress of language. But our prose has to be simple, and for it to be so, it is necessary to hammer it fine, as an artist hammers the metal for a work of art.

Medical journals shy away from literary quotations, poetic images, and humoristic turns of phrase. MD uses all of them. A train or an airplane, we believe, is no less powerful or speedy because its engines are garlanded with roses.

The Magic of Words

I have spoken elsewhere of the "magic of words" in illustration of our editorial approach in *MD*. (More Magic in Words, Editorial, *MD*, February, 1959.)

I remember an animal tamer in a circus that used to come to my native town every year. The tamer had a sorry-looking menagerie of what was optimistically featured as "wild beasts," with which he struggled patiently to make them leap and cavort at the crack of his whip. The years and hunger eventually killed off his troupe, until one year, to everyone's amazement, the tamer stepped into the ring with only the decaying hides of the dead beasts. Yet, so eloquently did he speak about the poor beasts and their experiences while he rustled and crackled each skin that the crowd, fascinated, forgot that they were not wild animals but only battered hides, and wildly applauded the golden-tongued trainer, who proved that words could be far more enthralling than the roar of beasts. The same magic of words is essential in a magazine.

Images

Images in *MD* are molded to its guiding concept, just as the pictures in a mansion bear witness to the artistic tastes of the owner.

We attach enormous importance to the illustrations we choose for our articles, because they strengthen the background and "climate" of the theme by adding color, atmosphere, or humor to the article.

The Face of Nefertete and a Snowflake Crystal

With *MD*'s covers we take particular pains. The purpose of the cover is to create the atmosphere and thematic setting for each issue. We, therefore, prefer the symbolic and romantic to the literal. For instance, for our cover story on helio- and hydrotherapy (*Sun and Water*, May, 1958) instead of using, say, a sun-and-water still life for the cover, we chose the bust of Nefertete, the beautiful Sun Queen, sister and spouse of Akhenaton, the daring Pharaoh who initiated the cult of the sun disk in Egypt, establishing not only monotheism in a polytheistic land, but also the first "official" heliotherapy in history.

For the cover of our 1957 Christmas issue, devoted to *Christmas and Medicine*, we chose a photomicrograph of the simplest and purest symbol of Christmas: a snowflake crystal. Its white and green colors embodied the emerald green of the pine and the virgin white of the snow, the colors of the Nativity, while the enlarged

crystalline structure of the snowflake revealed that the snow crystals naturally adopted the shape of Christmas trees! This was a most surprising revelation of how poetic nature can be.

The Biography of an Idea

Under no circumstances, however, does our preference for the original and the dramatic deflect us from a strict adherence to the facts pertinent to the basic theme of the issue. Pictorially, this concept has been translated into the incorporation in each issue of pictorial sections that bear a collateral connection with the basic theme, for instance, the development in photographs and illustrations of the "biography" not of a person, but of an idea, tracing its birth, growth, and maturity. We have already done this with anti-biosis, ataraxia, anesthesia, analgesia, antiseptis, opotherapy, and others.

We also use a novel approach to the photography of current events. For instance, during the last American Medical Association Convention (1959) we sent a photographer to Atlantic City to capture such things as the pictorial drama of inanimate objects at the convention: the silent rows of empty seats; motionless skeletons awaiting the call to their ghostly dance in the early morning hours before the meetings; the lonely objects—a handkerchief, a glove, a hat, a flower—left behind on benches and chairs; the convention considered as a gigantic body with fifteen thousand heads.

The Epic of Medicine

The technique we follow to integrate so many complex elements is best illustrated in our most ambitious project, the series on *The Epic of Medicine*. In this series we do not quote historical references on each period, but embody what we have learned from these in the narrative. In this way, the reader will learn about Mesopotamian medicine without more than a passing reference to the Babylonian clay tablets or the Code of Hammurabi, although what was contained in them is incorporated in the text. The contents of the Edwin Smith and Ebers papyri were transformed into data for the narrative, and those of the *Summa Hippocratica* into descriptions of the working methods of the Hippocratic physicians.

In other words, the source of information no longer appears in awesome academic dress but is turned into living, pulsating history.

Illustrations follow the same criterion, and so, next to the text of each episode of the "Epic" we include a pictorial section showing what has survived from each historical period and each great civilization, and their similarities and contrasts as compared with present-day medicine in each country. On the other hand, the illustrations in the narrative text itself are kinetic in character, portraying facts and persons *in action* rather than inanimate objects, and showing places and monuments not as dead dusty ruins but as a dynamic part of the physician's daily life in each country and period. The result is not a dry and dusty chronological, academic, exhaustive history, but a selective, literary and, above all, *living* story of the past.

To Navigate, the Essential Thing

I have told you practically the whole story of *MD*. There only remains now for me to say something about the spirit of *MD* for the future. We harbor the same hopes of the navigator who, guided by the silvery caravan of stars, sets out to new lands of promise. We believe implicitly in the byword of the daring Greek Argonauts: "The essential thing is not to live; the essential thing is to navigate."

Our future work is simple and clear. Above all, *MD* wishes to continue enriching the leisure of the physician. It also wishes the doors of the physician's often isolated mental compartments—professional, social, and human—to open to one unifying corridor: a historical purpose in life.

Thus the physician may come to replace the twentieth-century cult of anguish by a happy and serene equanimity. A life culturally enriched is the best way to attain ataraxia. Not the ataraxia that meant to the Stoics and Epicureans "tranquility through absence of perturbation," but that which twenty-five centuries ago the physician Democritus defined as calm alertness and happiness of soul. In modern terms this can be translated into self control and presence of mind in any emergency, akin to that supreme quality of the physician that Osler called *aequanimitas*.

In our world of atoms and sputniks, equanimity and ataraxia signify wisdom and total perspective. These things *MD* endeavors

to stimulate by feeding the cultural stream of the physician's personality.

Our magazine aspires to be an educational tool at the service of medicine. It is already used to stir in students the romantic ambition to be better physicians by being better men, and to realize that to be a good physician he must first be a good and kind man.

The beloved G. K. Chesterton paid a great tribute to journals when he said: "The roar of the printing wheels weaving the destiny of another day. . . . Here is the school of labor, and of some rough humility, the largest work published anonymously since the great Christian cathedrals." I myself would say that only by listening to its beats—the medical journals—is it possible to know the condition of the heart of Medicine.

V. EULOGY OF THE WRITTEN WORD

MD, therefore, is trying to revive the lost romance of Medicine, the greatness of its ideals, the enthralling adventure of its endeavors, the glory and sublimity of its triumphs. For this, *words* are our foremost implement. In the other fine arts the artist needs brushes, canvases, marble, chisels, musical instruments, models, studios or workshops, but *literature requires only a pencil stub and some sheets of paper*. The melody of music, the light and color of painting, the beautiful forms of sculpture, the gracile poetry of dancing, the stately strength of architecture—all these the writer can convey with such humble tools and that frailest vehicle of all—the written word.

The reservoir of language is a treasure chest replete with the most flexible and ductile but also the toughest and most rigid working material—words. Words, fine and common, wise and vain, musical and coarse, erudite and popular, sublime and profane—all these are within everyone's reach, like copper, silver, and gold coins overflowing from the open chest of language. Anyone can use words to his own fancy and discretion, to construct or destroy, to seed or devastate, to spread vulgarity or to create beauty.

The only way the writer can properly use words, which are the same for everybody, is by knowing how to *select* them—for their precision, originality, euphony, and beauty—and, above all, how to *combine* them into images, symbols, paradoxes, metaphors, and

concepts, imaginative and novel. On that rests the secret of greatness and elegance in writing. In journalism, the highest attainable peak is the combination of the best words in the best way possible to express the best concepts.

With words *MD* endeavors to carry the physician, as in a winged chariot, on a journey across realms of fact and fancy in time and space. *MD* is not happy to be just a magazine; it aspires to be a flying carpet.

It is in this spirit that *MD*, with the American physician's kind encouragement and the humble but sublime tools of word and image on the immaculate whiteness of the blank page, will continue giving life to the fabric of a dream.

Félix Martí-Ibáñez, M.D.

The Joys of the Table (*Editorial*)



The millenary empiricism of the cook and the modern knowledge of the dietitian have faced each other through the centuries. Today the physician is concerned with cooking both as a professional whose advice is sought by his patients and as a human being who relishes the pleasures of the table, for gastronomy is not totally irreconcilable with dietetics.

Cooking, like enjoyment of art, is tradition. That is why old countries, those along the Mediterranean, for instance, combine artistic feeling and superb cooking; while young countries, predominantly industrial and technological, are characterized by simplicity in their cooking. To be excited to emotional heights by artistic beauty or by exquisite food requires many centuries of apprenticeship. Few will deny that French cooking has always reigned supreme, followed by Italian and Spanish cooking. This type of cooking is more typical of countries characterized by a certain technological backwardness, which in turn enables them to concentrate on the culinary and other arts.

Brillat-Savarin emphasized the difference between the pleasures of eating and the pleasures of the *table*. The first entails only hunger and its appeasement; the second includes not only the food itself but its quality, how and where it is served, and with whom it

is enjoyed. Eating merely satisfies the pangs of hunger; the *table* excites the appetite and combines—to borrow George Bernard Shaw's definition of matrimony—maximum temptation with maximum opportunity.

Italian and Spanish cooking cater to hunger, which like sex is a call of the instinct. French cooking caters to the appetite, which is a fine, intellectual "emotion" demanding more than merely eating. According to Brillat-Savarin, hunger is an instinct of animals; appetite, an attribute of humankind. Italian and Spanish cooking possess an empirical meaning and a natural flavor; French cooking is independent of hunger and is pure, marvelous artifice and *mise en scène*. Italian and Spanish cooking, which trust somewhat to chance, cannot compete with artistico-scientific characteristics of the French cuisine; they are, however, far superior to the dinner served without a tablecloth on counters of industrial towns, or to the semisynthetic food of very young countries.

Physicians should take an interest in cooking and the pleasures of the table. Good cooking does more for home unity, to keep the man of the house and the entire family united, than the best television. Good cooking should bring out, not drown, the natural flavor of food, just as a dress should outline, not conceal, the graceful lines of a woman's figure. Good cooking need not be insipid when it is "scientific." In every meal there is a factor as important as calories, vitamins, and amino acids—the psychological element. A good meal should leave us *psychologically* satisfied. This was easy when cooking, a long time ago, was a slow, leisurely art. It became impossible when man began to be transported at vertiginous speeds by new locomotive methods, forcing him to eat quickly food prepared even more quickly. To complicate matters, canning and refrigeration were invented, with the result that modern man, unlike his prehistoric ancestors, no longer chases after food. Food now chases man. For he can today have tropical papaya in the icy Arctic wastes and Scottish salmon in the sandy African plains. The kitchen has been defeated by the laboratory.

It is important to revive the old love for fine, gracious dining, today limited perhaps to transatlantic liners, which often offer the traveler all the marvels of *international* cooking, and to an occasional automobile trip that may unexpectedly lead to one of those

old inns buried in the byways, effaced from the gastronomical map by the railroad, that other invention which years ago destroyed human contact with the landscape.

Cooking is a revealing key to the culture of a country. "National" dishes reflect a country's soul. The Spaniards' tendency to violence and their flair for bright colors are evident in their sharp-flavored, polychrome *paellas*—the watercolor of the Spanish kitchen—and their encyclopedic *cocidos*. The Japanese love for order and cleanliness is translated into those dainty miniature gardens that make up their favorite soups and dishes. The aseptic robustness and reserve of the British are transmuted into wholesome roast beef and Yorkshire pudding. The Scandinavian seafaring nature is reflected in their smorgasbords teeming with marine creatures. Gaelic subtlety finds expression in their delicate sauces; Italian earthiness in their *pastas*, seasoned with endearing onions, tinted with the scarlet of tomatoes, and crowned with the gracious touch of cheese. The American cuisine is assimilating in its melting pot the best of international cooking, just as it has assimilated all beverages in that often overpotent democratic fraternity of spirits, the cocktail.

Spanish cooking I know best. Consequently, I know its defects. But its excess of oil and garlic, its lethal rich sauces, its overuse of bread—all these are compensated by its rich variety, ranging from the cheese and chestnuts consumed by Don Quixote with the goat shepherds beneath the oaks of the Sierra Morena to the lavish extravagances prepared for Camacho's wedding. Spanish cooking has been for centuries basted by Mediterranean sunlight, breeding such exotic dishes as *arroz a banda*, rice cooked in concentrated fish and seafood broth, which imparts to every little grain all the essence of the Mediterranean sea; Andalusian *gazpacho*; trout and partridge *en escabeche*; and *turrón* of Arabian tradition, made with almonds, eggs, and honey. Spanish food demands the company of wines: sherry, dignified like an *hidalgo*; *amontillado*, solemn as a philosopher; *manzanilla*, gay like a dancing girl; and the *vinos de mesa*, which more than warm the stomach, and also tickle the heart.

The physician must be something of a gastronome for his patients' and his own sake. Did not Hippocrates stress equally

pleasure and wholesomeness in eating? An Italian glutton once said, "*Dello buono poco, ma questo poco abbondante*" ("Of the good just a little, but of this little in abundance"). The physician must perforce choose moderation in food, but why sacrifice quality and style?

No one can orient cooking as the physician can. He knows that taste and smell are functionally a unit. He knows therefore that it is better to replace the floral centerpiece—which finally makes the flowers smell of food and the food taste of flowers—by fruits, whose aroma does not interfere with that of food. The physician knows that the gourmet's instinct anticipated scientific knowledge by including in every meal butter, salad greens, cheese, and fruits, thus guaranteeing an ample ratio of vitamins, proteins, and other basic nutritive factors. He knows that the fatigue of the hunt improves the quality of game flesh; that broiling meat carbonizes the fat and caramelizes its sugar content; that the preparation of mayonnaise involves electric forces that act upon the egg and oil suspension molecules; that the same difference exists between fried and boiled food as between an oil painting and a water color, the oil and water drying up in each case, leaving but the polychrome image of the cooked food.

The physician knows as well that a good meal should consist of one basic dish, preceded by two dishes to tone up the stomach and tantalize the palate, and followed by two dishes as a transition to the dessert. And he appreciates the value of wines, which do not anesthetize the palate as cocktails do, and which, just like very old people, should be kept for better preservation in a horizontal position. Wine should be poured in a wide-rimmed glass that it may be improved by the greater oxygenation, and the glass should be colorless that it may transmute the wine into a glowing gem to be lovingly looked at, smelled, "dreamt on," and talked about before it is drunk.

Above everything else, the physician realizes the importance to health of initiating a crusade—beginning in his own home and continuing with his patients—to cultivate not the habit of eating but the pleasures of the table. This crusade would revive the spiritual pleasures inherent in fine dining, such as leisure, courtesy, and graciousness in presentation and service, a pleasant atmos-

phere, and the music of feminine voices instead of the radio. A crusade to turn us into cosmopolites in our gastronomic tastes is the best way to develop brotherhood between men and nations. The physician, who has presided over many a banquet, from the days of Eryximachus at Plato's Symposium to our times, knows that an occasion of gracious commensality is also an occasion of true confraternity.*

*This and all other Editorials in this book were written by the Editor, Félix Martí Ibáñez, M.D

Aesculapius in the Kitchen



*Cookery is become an art, a noble science;
cooks are gentlemen.*

—Burton: *Anatomy of Melancholy*

Gastronomy is defined as the art and science of good eating, yet in these days of calorie counts, protein analysis, and suspicion about lipids, the science appears to have outstripped the art. Even the time-honored word "gastronomy" has been ousted by the upstart "nutrition."

Wrote Spain's leading endocrinologist and authority on Spanish cooking, Dr. Gregorio Marañón: "The nutrition expert calculates, with tables in hand, the correct ration and determines the number of calories required by the human machine for its optimal performance. . . . No cook with any conscience would modify a single recipe from fear that his sauces or condiments might perforate his client's stomach . . . no master in the art of cooking would countenance a diet."

Awesome fact is that in the United States today there are some five thousand scientific workers engaged in food and nutrition research. There is only a fraction of that number of great chefs. For the physician who takes an interest in good eating, here are a few basic facts about the art and science of gastronomy.

Science. Reduced to its dullest denominators, cooking is intended to make food more digestible by softening such substances

as the muscles and connective tissue of meat, or by expanding starch granules.

Basic procedures in cooking are the application of hot air, as in baking, broiling, or roasting, or of hot liquid, as in boiling and frying. *Baking* is done in an enclosed chamber at temperatures up to 500° F. *Boiling* of water at sea level occurs at 212°, while simmering and stewing are usually done at around 185°. In deep-fat *frying* (also called *French frying*), food is dropped in fat at about 350°, forming a quick crust that prevents fat from penetrating the food. Shallow frying and *sautéing* are done at lower temperatures in a small amount of fat. *Braising* is a combination of frying, stewing, and baking.

Roasting was obviously man's first attempt at cooking; crude spits have been found in prehistoric caves. As the flavor of meat depends on a number of water-soluble substances known as extractives (mostly undefined), roasting and broiling are the two preferred methods of cooking to retain flavor.

The main effects of cooking on meat are to melt the fat, shrink the meat by contracting connective tissue, convert the insoluble collagen of connective tissue into soluble gelatin. In roasting and broiling, fluids expressed from the tissues dry on the surface of the meat, thus retaining many of the extractives lost in boiling or stewing. But the loss of B vitamins, especially B₁, is greater than in other methods of cooking.

When meat is boiled, steamed, or stewed, nearly half the water in the tissue is diffused in the surrounding water (or condensed water in steaming), taking with it mineral salts and water-soluble vitamins. Most of the extractives and some of the nutrients are transferred to the gravy or soup, involving no great loss. Actual destruction of nutrients is about 20 per cent of vitamin B₁ and 10 per cent or less of niacin and riboflavin.

Similar loss of vitamins is found in cooking fish. Unlike meat, the fatty fishes (mackerel, herring, salmon) supply fair amounts of vitamins A and D, which stand up well to cooking. Eggs lose very few nutrients in cooking, possibly a small loss of vitamin B₁. Boiling milk rapidly causes a loss of about 25 per cent of vitamin C and about 15 per cent of vitamin B₁.

Vegetables are another matter. Cereals, roots and tubers, pulses,

green vegetables, fruits, and nuts all lose nutrients when boiled. Main loss is in extracting the water-soluble vitamin C.

Green vegetables contain an enzyme that oxidizes vitamin C, but this enzyme comes into contact with the vitamin only when the leaves are wilted or crushed. Even in the absence of the enzyme, the vitamin can be oxidized if the cooking fluid is alkaline: hence the perniciousness of using soda to preserve the greenness.

Cooked in a small quantity of water, or steamed, green vegetables will retain about 75 per cent of their vitamin C; boiled in large amounts of water, the vitamin content may be less than 25 per cent. The carotene of green vegetables and carrots is more stable than vitamin C; losses during cooking are negligible.

Pressure cooking is gastronomy's most debatable subject. Opponents claim that it destroys more nutrients than boiling because of the higher temperatures in the process. Proponents say that cooking time is shortened, thereby reducing nutrient loss. Recent laboratory tests have demonstrated that the two effects almost exactly cancel each other out.

Under suspicion at present is deep-fat frying, widely used in producing potato chips, French fried potatoes, doughnuts. As of today, the Food and Drug Administration is encouraging research to answer these questions: (1) Is there a true toxic entity in heated fats, and if so what is its chemical nature? (2) Are there substances in heated oils that can act as weak carcinogens?

Freak methods of cooking at present include searing of meat with blow torches, use of infrared rays or electronic impulses. Engineers claim that electronic cooking is the culinary method of the future, rendering the use of hot air or hot liquid as obsolete as the dog-driven spit.

Art. Scientifically cooked food may preserve more nutrients, but if it is unattractive and unpalatable it will not be eaten in large enough quantities. Example: raw cabbage contains three times more vitamin C than the cooked vegetable, yet a person will eat merely one ounce of raw cabbage as against six cooked ounces.

As an art, gastronomy is peculiarly akin to the practice of medicine. Both require the co-operation of the five senses. Rhapsodizes Paul Reboux: "The crispness of fried dishes and pastry is agreeable to the ear. The softness of well thickened sauces and melting

foies gras, the succulent freshness of fruit, are pleasant to the touch. Is there anything more delightful to the eye than a dish *au gratin*, with its captive flavors imprisoned under its golden dome? Do not odors like those of seasonings or herbs, or of truffles, afford the highest gratification to the sense of smell? Of the palate there is no need to speak."

Gastronomic discoveries were made by culinary artists long before nutritional science was born. Wine was used in cooking meat for centuries before it was understood that it helped digest albumen. Lemon juice was sprinkled on fried foods without knowing that the citric acid helps to saponify oil.

Basic disagreement in the art of cooking is a long-standing feud between proponents of "plain" or "fancy" cooking. Anglo-Saxon tradition, brought to this country by its Pilgrim founders, favored plain cooking, frowned on complicated and spicy dishes as a Continental form of debauchery. Plain boiled or roasted foods are still staple diets in England and the United States, notwithstanding invasion by French and Italian restaurants.

Irony of this Anglo-Saxon attitude is that both America and the British Empire partly owe their existence to spices. In the fifteenth century, Arab traders and Venetian merchants had cornered the spice market, rousing the envy of other cities and kingdoms. Spain fitted out Christopher Columbus to find "spice islands" by sailing west, Vasco da Gama searched for them in the east. And in 1600 the English formed the East India Company to trade in spices, laying the foundation of an Asian empire.

Spices. There are more than two hundred kinds of spice, though the definition of a spice is a hot subject for debate. Where do spices leave off and herbs begin? Is garlic a spice, saffron an herb?

By far the most important spice in cookery is pepper. Common belief is that it is used to make food "hot" but its real function is to strengthen and emphasize the natural flavor of almost any food. Unlike many other spices that mask flavor with their own pungency, pepper has no strong aroma of its own.

Discovered by Columbus on the island of Jamaica was a berry which he called pepper but which is actually allspice (*Pimenta officinalis*), an elusive combination of the aromas of cloves, cin-

namon, nutmeg, and mace. Also found by Columhus was an orchid whose seed pods produced vanilla.

One of the most curious and expensive of all spices is saffron, used since antiquity both as an orange-yellow dye and a condiment. About 70,000 blossoms of the purple crocus are needed to make a pound of saffron powder. It is indispensable in fish dishes such as the Mediterranean *bouillabaisse*, some fish sauces, and seafood curries.

Another classic spice is mustard, originally used in the entire seed. An English housewife in 1720 discovered the method of making mustard flour by crushing the oil out of the seeds, then powdering the remainder. The method used in manufacturing mustard powder today is essentially the same.

Spices present something of a medical problem. For years physicians have advised patients with gastric disorders to avoid spices and highly seasoned foods, advice given without any scientific evidence in support. Most recent clinical studies on patients with gastric ulcers show the following data: Black pepper, chili pepper, cloves, mustard seed, and nutmeg are gastric irritants: the two types of pepper cause marked hyperemia and edema of the gastric mucosa, mustard produces erythema. But cinnamon, allspice, mace, thyme, sage, paprika, and caraway seed taken in food, even in larger quantities than normal, cause no significant change in the gastric mucosa. Neither is uropepsin excretion altered. So much for bland diets.

Psychology. Bland or no, the finest cooking in the world will fall flat if the psychologic elements in gastronomy are ignored. Vital factor is the environment in which food is eaten.

Brillat-Savarin's formula for a pleasant meal was: "food at least passable, good wine, agreeable companions, and enough time." Added he: "The pleasures of the table are a reflective sensation which is born from the various circumstances of place, time, things, and people who make up the surroundings of the meal . . . they depend on careful preparations for the serving of the meal, on the choice of place, and on the thoughtful assembling of the guests."

The psychosomatic relation between emotional states and gastric activity is now thoroughly understood. Yet gastronomes never needed physiologists to tell them that the preparation of a meal,

the loving attention given to an intricate sauce are relaxing exercises ideally suited to sharpen an appetite.

Significant development in high-speed American civilization in recent years is growing popularity of outdoor cooking. Tired businessmen have found unexpected relaxation in preparing broils and barbecues, combining craftsmanship with congeniality.

Frowned on by gourmets is social habit of scattering guests around a room, balancing buffet plates on their knees, making unstable conversation. Convivial talk around a table is regarded as an essential psychologic factor of good eating.

Hotly debated among gastronomes is whether good eating should be accompanied by music, as provided in some restaurants. The great Brillat-Savarin favored soft lights and sweet music during a meal, others regard music as a sacrilege. Physiologists can argue that the stimulation of the auditory sense can sharpen all other senses, which leaves the controversy much where it was.

A little over two hundred years since Brillat-Savarin was born, a plea could be made for a return to gastronomy's graces. Modern science has made possible a year-round supply of delicacies that would have made a nineteenth century gastronome's mouth water. Proteins, carbohydrates, and lipids have yielded most of their secrets. For Aesculapius in the kitchen or at table, less science and more art might be a regimen to prescribe for relaxation.

Black Diamonds



The world's most exotic and expensive vegetable is also the most mysterious: the truffle is the *Wunderkind* of gastronomy.

The ancient Greeks and Romans were alternately mystified and delighted with the strange fungus; modern gastronomers call it the "black diamond" of refined cooking. How did a humble member of the Ascomycetes family, cousin of penicillin, become such a treasure?

The story goes that about 400 B.C. the Greek poet Philoxenes, having conducted long and arduous personal research, declared: "Of all foods, there is none better able to facilitate births of love than the truffle." The truffle was thereupon dedicated to Aphrodite, and its glamorous career was launched. One early Greek notion was that truffles were daughters of the sun, conceived by the earth. But Pliny saw truffles as symptoms of an ailing mother earth, resulting from the injuries of excessive heat and rain, as well as from thunderbolts. Juvenal waxed lyrical in the fifth Satire: "Ah . . . keep your grain and beef for yourself, but send us your truffles."

When the barbarian invasions swept into Rome, truffles apparently disappeared. No mention of them has been found until the eleventh century, when the Arabian physician Avicenna discussed the delicacy in one of his works.

In the fourteenth century, King Charles VI of France smothered

his wedding banquet with truffles, and this touched off a truffle vogue that has never waned. Yet a hard core of physicians viewed truffles with alarm, claiming that they were indigestible, heated the blood, caused gout. One high-ranking courtier condemned the truffle as a "root of horrible visions" and a "villainous vegetable."

The most prized truffle of all, the black truffle of the Périgord, was discovered around the fifteenth century. Without peer in flavor, aroma, and texture, the Périgord truffle quickly became the chosen one of gourmets.

The truffle's reputation as an aphrodisiac persisted for centuries. A Périgord poet of the seventeenth century named Lagrange-Chancel rhapsodized:

I am, for a young woman, a dish so charming,
While her ardor is extreme,
That it is more profitable and pleasing
To give me to her love
Than to keep me for herself.

And in the last century the prince of gastronomers Brillat-Savarin, having pronounced the truffle the "black diamond" of the dinner table, noted that it could certainly "render women more tender and men more amorous."

Although there is no substantiation of the truffle's seductive abilities, Périgordian families still, in difficult situations, invite a swain to a well-truffled meal. And when asked for scientific proof of the value of such strategy, cultivated truffle men of the Périgord smile and shrug: "Who needs science when one has eaten the truffle all of one's life and knows well what the effects are?"

The Tuber. A truffle consists of 71 per cent water, 15 per cent carbohydrate, 10.4 per cent protein, 2.6 per cent minerals, 0.4 per cent fat.

The truffle is any one of the sac fungi of the genus *Tuber*, in the family of Ascomycetes. Reproduced by spores, it has a symbiotic relationship with the oaks near which it is found; the exact nature of this relationship still puzzles researchers. It was long believed that only the oak tree could foster truffles, but truffles are also found near elms, maples, and beeches.

Truffles are found the world over. There are actually some practicing truffle hunters in New England, but most of these garner the white truffle (*Tuber rufum*), the grey (*Tuber aestivum*), and others in varying shades; these were the truffles known to the ancients.

Gastronomes agree that the *Tuber melanosporum*, the black truffle, is the only one suited to fine cuisine, what a noted gastronome once called "the perfumed soul of the Périgord."

The Périgord, in the southwestern corner of France, is a sparsely populated region of fern-filled forests along the deep valley of the Dordogne. This region may have been the cradle of European civilization, as it contains the locality of Cro-Magnon, which gave its name to one of the most ancient human groups in western Europe; the cave of Lascaux is a rich lode of prehistoric wall paintings.

Trufficulture. The search for truffles is a strange blend of mining and agriculture. Despite endless attempts, no one has yet succeeded in finding and implanting a truffle spore; growers depend on nature's methods. The usual procedure is to buy a piece of land proved to breed truffles, or to plant oaks and wait ten or twenty years for the trees to mature, hoping that truffles will then appear.

Harvest begins at the first frost. Since no sign of a truffle shows above ground, the tubers must be literally sniffed out. Dogs are the oldest of the truffle-hunting animals, and there is still a school for truffle dogs in Alba, Italy.

In the Périgord, pigs are favored as truffle sleuths. A trufficulture will attend a pig market, surreptitiously carrying a truffle; if a pig lifts its head to sniff, it is bought. Usually it is a sow, and its owner will contrive to have her pregnant for the hunting season, in the belief that pregnancy sharpens the sense of smell. A pig is useful until about the age of five, after which its olfactory function appears to diminish.

Training consists of hiding truffles very shallowly, then leading the animal past them. The pig is allowed to eat the first ones found, later it learns to be satisfied with a handful of grain, possibly seasoned with a bit of truffle peeling.

When the frosts come, the pig is put on a leash, led snorting and protesting over the hillsides, sometimes covering as much as fifteen

miles in a day. Among the truffle oaks the animal will stop and sniff, then start burrowing into the ground. When it is near the prize, the farmer forces it aside with a cane, delicately lifts out a clump of earth with the curious violet black of the truffle showing through. The prize may weigh an ounce or several pounds; at fifteen dollars a pound each truffle receives careful attention.

The sale of truffles is carried on in a strange atmosphere of secrecy, almost equivalent to a black market. Périgord truffles are never sold in the open, only in the cafés of Périgeux, administrative capital of the region. Buyers sit in a café, patiently waiting for a grower to approach them with a valuable black diamond; the growers in turn shop around for the best prices.

Much of the truffle output of the Périgord is canned on the spot. The fungi are cleaned and peeled delicately by hand, in a kind of gastronomic diamond cutting. They are sterilized in steam, a necessary step, which canners complain costs them 30 per cent of the weight. They are preserved in salt water, Madeira, or cognac. Experts prefer the saline preservation for flavor; poorer epicures must be satisfied with the canners' peelings.

In the Périgord itself truffles are used liberally. A dinner in Périgeux may begin with *La grande truffe sous la cendre* (large truffles baked under ashes) proceed to an *omelette truffée*, to chicken cooked in a sauce turned black by truffles (the magnificent *poulet noir*), and even end with truffled ice cream.

What is the taste of truffles and what do they add to food are two questions that baffle most people. For some the aroma is nutty, for others it is the essence of a perfect wine. Claimed one local epicure: "Each man finds in one truffle the thing which delights him most."

All of France produces about 500 tons of truffles yearly, worth over ten million dollars. The fungi have not always been so valuable. During World War I the price fell to three francs the kilogram, thirty-five cents a pound; truffle forests were cut for firewood.

The French government and the truffle industry are doing their best to encourage trufficulture in the Périgord. A young oak costs about ten cents, and the government will pay part of this.

The U. S. Department of Agriculture has imported truffle oaks

from the Pénigord, is now trying to develop experimental truffle lands at Beltsville, Maryland

Trufflers are still preoccupied by the tantalizing mystery of the truffle how to implant truffle spores in oak lands rather than spend long years developing the forest in the hope that truffles will appear But the typical Gallic farmer's approach is that of M Henry Deffarges (president of the Propaganda Committee for the Pénigord Truffle)

Eh bien let us plant the oaks Then in a decade we or our children will draw fine profits, which will console us for this last mystery of *la belle truffle*

The Neuron Jungle (*Editorial*)



Man's constant quest for mental health is opening new paths through the neuron jungle.

Medical attitudes toward disease have always been preceded by social attitudes. For several millennia primitive societies buried the insane alive to protect themselves from the demons that possessed their souls. Eventually this was changed to chained isolation in dark cells. Isolation was followed by the use of drugs and physical methods; then by seismotherapy (convulsants, coma, and shock); finally by physiodynamic therapies seeking the *aura* or hidden cause of mental disease.

To advance in the knowledge of mental disease, psychiatry has reintegrated clinically the psyche and the soma; has included in the clinical history the *time* element and the *biographic* component; and has introduced biochemical studies in the solution of etiologic problems. Brain hormones and the pituitary-hypothalamic-adrenal axis are perhaps the *terra incognita* wherein lies hidden the secret of psychoses.

Current physiodynamic therapies pursue three practical objectives: to eliminate the symptoms—hallucinations, agitation, negativism—that make the patient “different” and difficult to treat; to establish communication with the patient; to treat him as though

he were suffering from any other illness, and to understand what is happening to him

The advancing psychiatric revolution was pioneered by the work of Cajal, Pavlov, Sherrington, Krapelin, Bleuler, Freud, Adler, Jung, and Meyer, all born in the most creative period (1849-76) in the history of psychiatry. As a result of their work, mental illness now has a physiochemical substratum, neurosis can be "heard" instead of only "seen" as in Charcot's days, the patient is regarded as a human being living a painful way of life, psychiatry is becoming medical anthropology, disease is a chapter in biographic evolution, and the total personality—social and historical—of the patient is carefully studied.

The most important recent contribution has been the ataractic drugs, which leave the patient *ataraktos*—with mental peace and without agitation—and often able to communicate better with the psychiatrist, thus making a *patient* of the "mental case."

Psychochemistry and hallucinogenic drugs are also used in fields other than psychiatry and may one day explain the similarity between the imagery of literary geniuses—Baudelaire, Coleridge, Poe, De Quincey—and mystics and that of persons under the influence of "phantastica" drugs. Should schizophrenia prove to be the result of a gigantic biochemical error in the organism, genius might then be the result of a "small" metabolic error!

Since psychiatry is dedicated to the study of alterations in human communication, it, more than any other medical discipline, should render its own communication system less confusing. Psychiatry should be approached with the healthy criterion of a naturalist, and its phenomena should be described with the same terse simplicity with which Darwin counted and described the leaves of a plant.

An organicistic approach, integration with other sciences, and clarity of communication seem to be the immediate objectives of physiodynamic psychiatry. Collaboration between physicians and psychiatrists in preventive mental hygiene should add fresh laurels to the wreath of glory woven by the giants of psychiatry.

Psychiatry: New Look



The caverns of the mind are obscure . . .

—Shelley: *Speculations on Metaphysics*

Medicine's understanding and treatment of mental diseases, after groping for centuries along tangled paths, is today moving down a new road that may lead psychiatry into its golden age.

Marching in company with biologists and biochemists, the forward-looking psychiatrists of the present decade are revolutionizing their specialty and shaping a new medical entity.

New trend was shown in the program of the Second International Congress for Psychiatry held in Switzerland in September, 1957. Broad theme of the Congress was the present knowledge about the group of schizophrenias, including pathophysiology, somatic treatments, pharmacologic therapy, psychoendocrine studies, and the newest chemical concepts of psychoses.

For the benefit of those who encounter psychiatric problems more and more frequently in their practice, we here present a panorama of the new developments.

Forerunners. The present-day organicistic approach to mental illness enjoys an honorable ancestry, stemming from Hippocrates ("The brain is the organ where madness is born") and Plato, who attributed epilepsy to the obstruction of air in the head by a mixture of phlegm and black bile. Towering during the Age of Reason was

Giovanni Morgagni (1682-1771), who enunciated the concept of insanity as an organic disease.

Nineteenth-century pioneers included Wilhelm Griesinger (1817-68), who tried to demonstrate that every psychosis is determined by specific cerebral lesions; Theodor Meynert (1833-92), who showed a link between cerebral circulatory dysfunctions and mental disorders; and Karl Wernicke (1848-1905), who associated mental disturbances with centers of "focal infection." Around the turn of the twentieth century, *Treponema* germs were linked with the development of dementia paralytica.

Keynote of the present psychobiologic approach was sounded in 1899 at the International Congress of Psychiatry. After Russia's great neurologist Sergei Korsakov had shown a link between mental disease and degenerative neuritis, Professor Benedict said: "He has confirmed to the maximum the theory that all psychopathology can be reduced to lesions of the brain and the nervous tissues."

But this keynote's sound was drowned out in the clamor raised by the new psychologic psychiatry of Sigmund Freud and his disciples. The origin of psychoses was now sought in the unconscious, the "stratification" of the psyche (id, ego, superego), the concept of psychosexual development (oral, anal, phallic stages) and its regression, and the use of psychoanalytic techniques in therapy.

Although Freud himself once wrote: "All our provisional ideas on psychology will some day be based on organic substructure," the organicists were overshadowed by the psychoanalytic schools. Nevertheless a stubborn few continued on their way: Jakob Klaesi with prolonged sleep therapy in 1920, Manfred Sackel's insulin coma treatment in 1933; Laszlo Meduna's use of pentylenetetrazol in 1934; Ugo Cerletti's electroshock in 1938; Egas Moniz' spectacular prefrontal lobotomy in 1938.

The therapeutic effect on insanity of shock or some other severe agitation had long been known. Hippocrates and Galen noted cases of patients recovering from mental illness as a result of a fever. With discovery of electricity still centuries away, the Roman emperor Claudius' physician Scribonius Largus prescribed a kind of electroshock, an electric eel applied to the head, for "chronic and intolerable headache." Modern observation that epileptic

seizures seemed to cure schizophrenia led to experiments with induced convulsion.

As endocrine products became available, thyroid, gonadal, adrenal, pituitary therapies were undertaken, with hope based on a growing knowledge of the link between endocrine function and psychic behavior.

Other biochemical therapies were developed using histamine, acetylcholine, desoxycorticosterone. From the Creedmoor State Hospital histamine researches and subsequent neuroendocrinologic formulations, were predicted in 1949 the psychosis-inducing effects of cortisone and ACTH.

Difficulties with clinical research in hormone therapies, voiced by pioneer Dr. Roy G. Hoskins, have been echoed by investigators of other physiodynamic therapies, e.g., lack of standardization in diagnosis from hospital to hospital, length of treatment, criteria of improvement in patients.

Problem Today. More than half the nation's 1.4 million hospital population (about 780,000) are mental patients; lacking are beds for 300,000 more who might benefit from hospitalization. Some authorities estimate that as many as 30 per cent of the general population contribute to the pool from which psychotics evolve.

Leading all mental diseases is the category loosely termed schizophrenia. Erroneously defined by laymen as "split personality," the term covers a group of psychotic conditions formerly called dementia praecox. Basic symptoms: withdrawal from world of reality, delusions (ideas of persecution or omnipotence), and hallucinations, a galaxy of morbid concepts associated with narcissism, homosexuality, autoerotism, also various phases of catatonic stupor or excitement.

Biology. Principal question confronting researchers today is whether there exist fundamental organic differences between schizophrenic and normal subjects. Variations from normal have been noted in blood clotting, plasma glutamic acid, blood levels of glutathione of which glutamic acid is a constituent. Also noted was a high copper content, high level of ceruloplasmin (blood enzyme that binds most of the body's copper), high insulin, low oxygen, and lack of vitamin A.

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One comment on high ceruloplasmin level was that this occurs also where there is intensive cellular growth, as in neoplasms and pregnancy, also in any non-specific stress, e.g., surgery. A Tulane group viewed an increase in ceruloplasmin as a reaction to stress. The Creedmoor group some time ago recorded a low incidence of cancer of the breast and prostate in more than one thousand mental hospital autopsies, and the infrequency of diabetes, asthma, and hay fever in active psychotics.

In 1951 the same group standardized a physical blood test using ultrasound to record autographically changes in physical characteristics of blood as a differential between psychotics and non-psychotics. Accuracy of identification was about 70 per cent in controls and 80 per cent in psychotics.

More recently, the Tulane workers found a protein fraction (named *taraxein*) in the blood of schizophrenics that could induce a brief (one to two hours) psychotic state resembling schizophrenia in normal subjects.

Cautious researchers point out that the schizophrenic patient does not sit still to have his biochemical portrait drawn. Physically quiet in a catatonic phase, he may be in a state of intense emotional disturbance, with corresponding adrenergic stimulation which affects blood levels of amino acids. A method has yet to be found for measuring the degree of tension and anxiety of patients at the time of taking biologic samples. Further problems of clinical researchers are: metabolic changes in schizophrenics seemingly linked with their emotional states. Some tend to go in and out of negative nitrogen balance with changes in their clinical status.

The question of when and how often to collect samples is itself a puzzle. Morning collection of samples for basal metabolic study may be deceptive, as reversal of night and day activity is not unusual with schizophrenics. Collection from newly admitted patients is unsatisfactory because many schizophrenics tend to react intensively to any new environment. But if samples are taken only from patients who have shown metabolic stability for a given period, most acute schizophrenics would be automatically eliminated from biochemical research.

Research. Main avenues of investigation at present are (1) biochemistry of brain and nervous tissue; (2) the action of tran-

quilizer drugs; (3) the mechanism of hallucinogenic substances; (4) data from self-induced psychoses.

Biochemistry. Basic theory in the biochemical approach to mental disease is that some substance or substances in the body disrupt communications within the central nervous system.

Close investigation of animal synapses indicates that transmission of signals is facilitated by acetylcholine, inhibited by adrenalin. Chemical relatives of adrenalin are the hallucinogenics like mescaline, bufotenin, plants used by primitive people, amphetamine, and the hormone serotonin present in the brain and other tissues. One of the most powerful inhibitors of synaptic transmission was found to be serotonin.

Intriguing is the discovery that many of these compounds that affect the central nervous system share an indole or similar nucleus.

Theoretically, faulty metabolism of ndrenalin or any of its chemical cousins in the body could produce an excess of these substances and thereby inhibit the normal function of nerve transmission. Conversely, faulty metabolism could produce an excess of acetylcholine, thus speeding up nerve communication and flooding the brain with impulses. Says Pittsburgh's Professor Amedeo S. Marrazzi: "Mental health, then, depends on the proper functioning of the homeostatic mechanisms that maintain an appropriate balance of chemical messengers in the body." Predicted researchers from the Van Ophuijsen Center in 1950: "We are on the threshold of metabolic medicine and metaholic psychiatry."

Tranquilizers. Important key to present-day research is the action of tranquilizers in psychotic patients. Animal experiments have shown that such drugs as chlorpromazine and reserpine can block the inhibitory action of mescaline at the synapses. Not far-fetched is the possibility that they likewise block the action of adrenalin and serotonin in the human nervous pathways.

Equally interesting to researchers is that chlorpromazine produces a syndrome like that resulting from lesions in the caudal hypothalamus and the tegmentum of the cephalic end of the mid-brain. The hypothalamus is the presumed seat of Cannon's "emergency response" in animals and human beings. The tranquilizer apparently reduces this response.

Another comparison is with the effects of brain surgery. Paris and London hospitals reported that chlorpromazine produces a "pronouncedly different" pattern of personality changes from that of lobotomy.

Hallucinogens. Since a day in 1943 when a Swiss biochemist accidentally gave himself a dose of lysergic acid, researchers have eagerly pursued the study of experimental psychoses. Volunteers have been plentiful: the investigators themselves, hospital staff members, members of a religious group, healthy young inmates in a state prison. Author Aldous Huxley reported his experiences with mescal. Noted he: "Primitive man experimented with every root, twig, leaf, flower, every seed, nut, berry and fungus in his environment." All the naturally occurring sedatives, narcotics, euphorics, hallucinogens, and excitants appear to have been known since prehistory.

Closest to the effects of lysergic acid are those of mescaline; extracted from the peyote variety of cactus, traditionally used by Mexican and Southwestern Indians to induce visions in ritual ceremonies.

Curious investigators, following discovery of bufotenin in *Amanita muscaria*, a species of mushroom, pursued the mushroom story. One variety called fly-agaric is used by Koryak tribesmen in Kamchatka for enjoyable hallucinatory states. Another is the sacred mushroom of the Aztecs still used in remote Mexican villages to produce religious ecstasies.

For comparison of experimental with authentic psychoses, a few patients, recovered or enjoying remissions, have added their subjective experiences to the total data. Known now is that an induced psychosis resembles the naturally occurring variety in anxiety, perceptual changes, disturbances in thinking, mood, and formation of delusions.

Volunteers show individual variations in symptoms, as do schizophrenics. Hope is that safe experimental study of psychoses, now possible for the first time, will greatly add to knowledge of schizophrenic processes, this should in turn lead to improved therapy.

Catatonia, one of frequent forms of schizophrenia, has been induced with bulbocapnine, an alkaloid of the plant *Corydalis cava*. The late Dr. Holland de Jong, long an investigator in this field,

concluded in his last report that experimental catatonia was a general reaction form of the central nervous system without a "catatonizing nucleus," i.e., a specific single cause, with one exception: changes in metabolism through the intestine or liver could produce catatonic phenomena.

Isolation Psychoses. Not to be outdone by pharmacology, psychologists induced schizophrenia-like states without drugs of any kind, simply by separating a subject from the stimuli of daily life.

In one experiment, part of a study on boredom at routine tasks, subject was asked only to lie quietly on a comfortable cot in a cubicle twenty-four hours a day, wearing goggles that permitted him to see light but not forms, cuffs to limit tactual perception, with an air conditioner's hum virtually shutting out other auditory stimuli.

Despite munificent twenty dollars a day for thus shedding work and worry, most of the college student volunteers quit, some within a few hours. Reported results with fourteen of forty-six were impairment of problem solving, inability to concentrate, some defect of sensorimotor control, and hallucinatory experiences (visual, auditory, somesthetic), similar to the effects of mescaline.

Neurophysiologist Dr. John Lilly tried a more drastic experiment on himself and others: subject lay in a tank of water at 94° F. wearing only a blacked-out breathing mask. In three hours of submersion Dr. Lilly reported loss of control of the conscious mind by stages, culminating in vivid three-dimensional visual hallucinations similar to those of schizophrenics.

Other Fields. The brain and nervous pathways are being investigated along two other lines of research: physiology and cybernetics.

In the physiologic field, brilliant progress of nineteenth and early twentieth century neurophysiologists still left many puzzles awaiting new techniques. One was the reticular formation, which frustrated investigators who named it the "manure pile" of the nervous system. Disgusted metaphor proved prophetic: as barnyard fertilizer prepares soil for seed, the nerve network, no bigger than a man's little finger, in the central brainstem is seen as preparing the brain to receive stimuli.

Puzzling to anatomists is that the sensory nerve trunks, directly connected with the cortex, also send brushlike branches into the reticular formation on the way. Technique developed by California neurologist H. W. Magoun and associates, for electrical stimulation of intact, unanesthetized animals, solved the puzzle: The center is the arousal mechanism of consciousness.

Stimulation of the cortex results in blurred gradual awakening, while direct stimulation of the reticular activating system (RAS) produces a typical, i e., normal, waking pattern. Anesthetics, sleep-inducing drugs, and stimulating drugs appear to work not on the cortex but on the flow of nerve impulses to the RAS.

In another area, Dr. Lilly and workers of the National Institute of Mental Health were following emotional circuits, accidentally discovered a "pleasure center" in the fornix, saddle-like area between the brain's two hemispheres.

A rat with an electrode planted in this area continues working the bar that stimulates it electrically until it drops; when given this stimulation it forgets its food. A monkey rudely awakened snarls angrily; with stimulation of the fornix it instantly becomes friendly, strokes the experimenter's hand.

Said Dr. Robert H. Felix, director of the National Institute of Mental Health: "If there is a circuit in the brain which, when stimulated by some means causes this kind of good feeling, it is there for some purpose. I am almost frightened to say what I think may come of this in terms of the treatment of the mentally ill. . . . But in the field of physiology I think it is the most exciting single discovery."

For the cyberneticists, the human organism is seen operating physiologically as a self-corrective feedback-controlled mechanism, with homeostasis compared with a closed-loop system.

Problem of oscillation in an automatic gun-pointing apparatus, which must correct for rolling of ship, suggests human responses to a stress situation. A faulty mechanism may swing from possible loss of control to overcontrol, i e., overcompensation. With anxiety described as the individual's reaction on perceiving the danger of losing control, compulsive behavior as a technique to fight anxiety is likened to overcontrol.

In another simile from modern mechanics, schizophrenic behavior is seen as a breakdown in communication. How the groundwork may be laid for this breakdown is hypothecated in a child-mother relationship in which the child is subjected to contradictory messages of love and rejection. A computer can reject inadequate or confused information fed into it, i.e., avoid the conflict. The child, because of his dependent status, is unable to avoid or escape from it.

Speculated psychoanalyst Dr. Lawrence S. Kubie: "Psychotic depressions and psychotic elations . . . seem to be maintained by re-entering circuits which are almost impervious to psychotherapeutic influences but respond to overwhelming electrical stimulation and/or marked hypoglycemia."

Working along entirely different lines is Chicago's Dr. Meduna who holds tentative theory that non-specific accidental causes produce an allergic-like reaction of brain tissue, probably affecting the protein of brain cells. It is possible that electroshock treatments work by destroying a number of cells in the brain, these in turn act as antigens which produce antibodies. If such antibodies could be produced externally, *an antiserum for schizophrenia might become possible.*

Concurrently, many research problems hitherto thought insoluble waited only for technologic progress. Among new tools and techniques used by psychiatric researchers: radioactive tracers, autoradiography, ultrasound, electronic brain exploration, fluorescent microscopy, color television microscopy, microchemistry. Changing in step with psychiatry's "new look" is the public's attitude toward mental health. The lay press and other communication media have educated many Americans to regard mental disease as no longer shameful or hopeless.

There is little doubt that, with the advent of the tranquilizer drugs, mental hospitals have become more like ordinary hospitals in atmosphere. Ward life has become more serene, and physicians and nurses have in most cases been freed from the constant problems of restraint and sedation in medical care of patients. In many hospitals, the tranquilizing drugs have supplanted shock therapy for agitated patients. The best results reported in the literature have generally been obtained with the most disturbed patients, many of whom had been serious ward problems for years and who exerted a disintegrating influence on others.

While the morale of patients, staff, and families of the mentally ill has improved, so have pathways of communication between psychiatrists and patients. Patients who had remained obstinately sunk in apathy or mutism for years were found to take an interest in their surroundings and converse with some coherence with psychiatrists.

One unforeseen practical dividend in the hospital use of tranquilizers is a saving in wear and tear on plant equipment, furnishings, and clothing. Conversely, more funds are frequently needed for recreation facilities and occupational therapy equipment.

With the present tranquilizer drugs in use, the forecast is that while the population of mental hospitals may decline, the need for outpatient services will grow.

Integration. In the present-day dynamic approach to psychiatry, three main goals are set: reduce the severity of symptoms through drugs or other therapeutic methods; establish communication between psychiatrists and patients across the dark boundaries of mental illness; seek the physiologic or biochemical factors that may cause or exacerbate symptoms.

The future lies in an integration between investigators in experimental medicine, biochemistry, endocrinology, atomic physics. Breakdown of frontiers between these disciplines must lead to clearer common concepts, until recently obfuscated by specialized terminology. For the countless thousands who are or may become mentally ill, today's light penetrating into the "obscure caverns" of the mind radiates genuine hope, for the medical and allied professions it illuminates widening breaches in one of medicine's most formidable barriers.

Hypothalamus and Politics



When Bismarck wept nervously during a decisive battle, Napoleon smashed chinaware, Cavour threatened suicide, and Hitler chewed carpets, was the hypothalamus to blame? And if medical science could gain control over that mysterious region of the subcortex, would the future face of history be changed?

Scientists have long been intrigued by the phenomena of mood, emotions, and personality. For the past two thousand years the "seat" of the emotions has been imaginatively located in the stomach, spleen, liver, and heart: e.g., be "unable to stomach" something, "have an heart for it," or "vent one's spleen." At present time, the most popular "seat" of man's emotional life is the hypothalamus.

Once called the "visceral brain," the hypothalamus regulates or influences body temperature, water balance, blood pressure and blood sugar, gastrointestinal motility, and secretion, appetite, sexual activity, and the sleep-walking mechanism. Moreover, it accelerates the heart, dilates the pupils, produces panting, and makes hair stand on end. The sum total of these effects is what W. B. Cannon termed the "emergency response" in animals or human beings. Here are a few seemingly irrational "responses" in men who have influenced history.

Political Tantrums. Prince Otto von Bismarck, popularly known as the Iron Chancellor, once confided to the English painter Richmond that he was "all nerves." He was constantly in the throes of nervous excitement and frequently took to his bed with "nerve pains." At the decisive Battle of Königgratz (Austro-Prussian War in 1866) he was overcome by nervous fits of weeping. When severely annoyed, he would vomit gall and take to his bed in a rage, both reactions mediated through the hypothalamus. Outwardly a symbol of concentrated power, to his wife Bismarck was just a "poor sick duck."

Emotional behavior verging on the maniacal was also the gaudier side of Napoleon's character. Under the influence of hypothalamic reactions, he could throw a prince out of the room, kick a venerable senator in the stomach, smash costly chinaware to break down an Austrian envoy's resistance, and rant and rave at Metternich for nine hours at a stretch. His sexuality was woefully inadequate, with frequent bouts of psychogenic impotence, and he suffered from a variety of gastrointestinal ailments. He once admitted that "my nerves are irritable," a superbly imperial understatement.

A fellow Italian, Count di Cavour, was another "hypothalamic statesman." As a youth he once flew into such a rage that he threatened to stab himself or jump out of a window. Later, when he learned that Napoleon II would not help him to unite Italy, he declared: "There is nothing for me to do now but to blow my brains out." How far Cavour's explosive rages hampered Italian independence and unity in the nineteenth century is an intriguing puzzle for historians.

Closer to our own time, the most loathsome representative of hypothalamic politics was Adolf Hitler. He lived in a self-created atmosphere of what some have called "temperamental heat" or "raving excitement." His explosions of fury bordered on mania, though whether he actually chewed carpets is a debatable biographic point. When he was appointed Chancellor, he burst into tears; when he heard of the French capitulation in 1940 he danced a jig of joy. Professor Max Gruber (University of Munich), who saw Hitler at close range, reported in a private letter that his facial expression was "not that of a man in full command of himself, but of one frantically excited." Alternately frenzied and morbidly

despondent, the late dictator was a prime example of behavior under the rule of the hypothalamus.

Hypothalamic History. The most ambitious exponent of a hypothalamic interpretation of history was France's Gustave Le Bon (1841-1931). His thesis was that emotion rather than intelligence was the determining factor in history and culture. For him the crowd or "mob" was an aggregation in which the conscious individuality of each person is lost or merged in the collective action dictated by unconscious impulses or emotions. The masses, concluded Dr. Le Bon cynically, are utterly devoid of reason. It should be noted that, at the time his writings were most popular (first decades of this century), little was known about the physiology of the hypothalamus.

The Future. Granted that the hypothalamus has wreaked a goodly toll of havoc in world history, where does medical science go from here? Lobotomy and electroshock procedures may be of value (still debated) in relieving certain psychoses where hypothalamic symptoms may appear, but as a definitive therapeutic approach to the problem of hypothalamic disorders they are out of the running.

Moreover, any physiologic approach to the term "emotion" is likely to drive psychologists and psychiatrists into their own private frenzy. Behavior patterns that appear to be "emotional" have been traced in hundreds of experimental animals to lesions or irritation of the hypothalamus. Electrical stimulation in the hypothalamic region has produced such symptoms of emotion as increased blood pressure, pupil dilatation, rise in blood sugar, defecation and urination, horripilation.

The most fascinating and promising area of neurologic research at present is in the functional connection between the hypothalamic region and the anterior lobe of the pituitary gland. The link with the gland's posterior lobe is fairly well understood, but how does the hypothalamus exert an influence, if it does, on the other portion which plays so important a role in hormonal balance?

The number of nerve fibers passing into the anterior lobe from the infundibular stem is, say the best authorities, too small to affect the gland cells. The latest theory, supported by some evidence, is that the hypothalamus itself releases some type of neurosecretion

into the portal system of the pituitary. This release may be triggered by stimuli received by the hypothalamic neurons via nervous pathways, or possibly through some changes in blood composition.

In the practical medical field, the recent swift rise of tranquilizing drugs opens the door to the chemotherapeutic treatment of hypothalamic disorders. Whether any of the current ataraxics exerts a direct influence on the hypothalamic region is now being investigated in many laboratories. From this research it is not fanciful to suppose that a drug will be found that will act specifically in the hypothalamic region. When that happens, another giant step will have been taken in man's endless struggle to replace the irrational by the rational and substitute peace for war.

despondent, the late dictator was a prime example of behavior under the rule of the hypothalamus.

Hypothalamic History. The most ambitious exponent of a hypothalamic interpretation of history was France's Gustave Le Bon (1841-1931). His thesis was that emotion rather than intelligence was the determining factor in history and culture. For him the crowd or "mob" was an aggregation in which the conscious individuality of each person is lost or merged in the collective action dictated by unconscious impulses or emotions. The masses, concluded Dr. Le Bon cynically, are utterly devoid of reason. It should be noted that, at the time his writings were most popular (first decades of this century), little was known about the physiology of the hypothalamus.

The Future. Granted that the hypothalamus has wreaked a goodly toll of havoc in world history, where does medical science go from here? Lobotomy and electroshock procedures may be of value (still debated) in relieving certain psychoses where hypothalamic symptoms may appear, but as a definitive therapeutic approach to the problem of hypothalamic disorders they are out of the running.

Moreover, any physiologic approach to the term "emotion" is likely to drive psychologists and psychiatrists into their own private frenzy. Behavior patterns that appear to be "emotional" have been traced in hundreds of experimental animals to lesions or irritation of the hypothalamus. Electrical stimulation in the hypothalamic region has produced such symptoms of emotion as increased blood pressure, pupil dilatation, rise in blood sugar, defecation and urination, horripilation.

The most fascinating and promising area of neurologic research at present is in the functional connection between the hypothalamic region and the anterior lobe of the pituitary gland. The link with the gland's posterior lobe is fairly well understood, but how does the hypothalamus exert an influence, if it does, on the other portion which plays so important a role in hormonal balance?

The number of nerve fibers passing into the anterior lobe from the infundibular stem is, say the best authorities, too small to affect the gland cells. The latest theory, supported by some evidence, is that the hypothalamus itself releases some type of neurosecretion

To Walk and to See (*Editorial*)



"Notes on Walking and Seeing" was the title the classical Arabian authors gave their travel books. And the Greek philosopher Solon also recommended travel in order "to see."

To travel is to turn our attention outward, to grant temporary sovereignty to the senses over thought and meditation, to submit to and enjoy without restraint the blazing impressions conveyed by sight, hearing, and smell. When we travel we extravert ourselves; we live on the borderline between our senses and the outer world. The constant change of scenery makes the traveler feel weightless, almost ectoplasmic. Relaxing temporarily the mind's command permits the wandering images of things to enter, like eager summer birds, the open windows of the senses.

Man is the most restless of all living beings. From the beginning he has roamed the earth, on foot and horseback for millennia, only recently in power-driven vehicles. Perhaps travel holds such fascination because living is traveling through time just as traveling is living through space.

Today we travel far more than ever. But we no longer travel forced by hunger and cold as prehistoric man was, or by epidemics and wars as medieval man was, or by the passion for exploration as Renaissance man was. Today we travel because we want to

know every corner of this world of ours, which, as Chesterton said, has expanded with the microscope and contracted with the airplane.

We also travel to flee our habitual milieu and daily worries, to cease temporarily being participants and become instead spectators of life on different geographical stages. A journey is motion through space; but it is also a jump toward that precious anonymity of the traveler, which affords the opportunity to become, to quote Hazlitt, just "the gentleman in the parlour."

The physician through the ages has been a traveler in his own right as well as a counselor to travelers. Hippocrates traveled far and wide and compiled a splendid treatise on public health for the wandering physicians of his time. The first great physician-traveler and explorer of the ancient world was Democedes of Croton (500 B.C.), who traveled through Asia carrying in his knapsack the precious legacy of Greek medicine.

The list of physician-travelers is extensive and distinguished. There was the Portuguese Garcia de Orta, who explored India in the sixteenth century; the surgeon Monkhouse, who overcame scurvy on Cook's expedition to the South Seas in 1769; Walter Russell, who accompanied Captain John Smith on his explorations of the Chesapeake region; the Scottish surgeons James Bruce, who discovered the source of the blue Nile, and Mungo Park, who explored Senegal and Kaarta; Dr. Livingstone, who discovered the Zambesi River and Victoria Falls; and, among the explorers of Arabia of the past century, Burton, Palgrave, and Doughty, who studied medicine as the best way to capture the confidence of the native tribes.

cloud in a cloth bag," which culminated in the halloon, the first human being to ascend in it was the Frenchman Jean Pilatre de Rozier, physician-apothecary. He subsequently became the first martyr to aeronautics when he perished in an attempt to emulate a Boston physician named Jeffrie who, with Pierre Blanchard, for the first time crossed the English Channel in a balloon. And it was Paul Bert, a pupil of Claude Bernard, who founded aeronautical medicine.

In some respects travel is more dangerous today than it was in the past. The old slow way of traveling—on foot or horseback or in a lazy slow hoat—allowed the traveler time to adapt himself mentally and physically to new environments. The airplane has revolutionized all this. The mind no longer arrives, as in the stage-coach era, many days before the battered hody. Now the body arrives almost anywhere in the world in a few hours, while the mind may "arrive" days later, thereby suffering great stress for lack of time to adapt itself to the sudden change. There is also the danger of disease carriers—birds, rodents, flies, mosquitoes—stowed away in fast vehicles. They can now do their destructive work with the speed of lightning.

On the other hand, the traveler today does not suffer the tyranny of wind and storm, which in the past governed all travel, and high-speed travel prevents the fatal avitaminosis of the days of "wooden ships and iron men," and the so-called "sailor's vapors" or psychoses common in the endless, monotonous voyages between two blue walls—sky and ocean—of British and American frigates.

The demand for counsel on travel from physicians increases daily. The traveler today is able to take with him everything that will help him—food, clothes, artificial climate, even adequate psychological preparation—to enjoy travel without pain and without fear, and return home the richer for his experiences. In this lies the joy of traveling.

As the Greek Argonauts, who symbolized life as incessant sailing, said, "The essential thing is not to live; the essential thing is to navigate."

Vast and Wide Is the World (*Editorial*)



Should you go to Venice, that Byzantine *grande dame* who languorously reclines on the green mirror of the Adriatic amusing herself watching the black swanlike gondolas glide by, visit the Ca Polo Stop a moment before this mansion, which is now but a pale remembrance of History, and let your thoughts wander to the daring Venetian lad who in the thirteenth century crossed Trebizond, Mosul, Baghdad, Persia, the salt deserts of Kerman, the frozen Roof of the World at the Pamirs, the jade-encrusted lands of Kashgar, the mysterious Gobi Desert, forever lashed by the demons of the wind, the Mongolian steppes fabulous Cathay, and finally reached the vast empires of the Great Khan Sixteen years later, Marco Polo returned to his native land But not for long He set out once again and roamed Tibet, Afghanistan, Burma, Siam, Sumatra Ceylon, and India His twenty seven years of travel, captured like many hued butterflies in his book *Il Milione* joined in one great, fabulous adventure the sophisticated Venice of Dante with the exotic lands of Asia

Marco Polo not only became a prince of merchants, papal envoy, governor of a Chinese city favorite of Kublai Khan, master of exotic languages war correspondent, and the first traveler-writer, but his book the most romantic travel epic in History,

established the first bond between East and West. In his great cavalcade, Marco Polo integrated Geography and History. His footprints across the vast Asiatic sands still endure on the sands of Time.

Jet planes today make Marco Polo's trip appear slow and erratic. Yet, few books convey as powerful a sensation as Marco Polo's does of the immensity of the world, of the importance of geography in the creation of History, and of the vital role of space in the march of events through Time. In our profession, which requires most of us to travel often, if only to call on patients, it is vitally important to remember that Geography can greatly increase our knowledge of Medicine.

Geography is neither the nacreous cloud puffs that float beyond the windows of the zooming stratoscruiser nor the telegraph poles that rush to meet us on both sides of our speeding car. That is merely space, across which we speed in an attempt to overcome the tyranny of Time. Geography is the land, its climate, its wealth and poverty—it is all that contributes to the creation of the landscape, where man works, loves, fights, dreams, and dies. It is also the environment where man enjoys health or suffers disease, which is always influenced by environment. For, let us never forget the words of the Renaissance humanist Jean Fernel: "Geography is to history what anatomy is to medicine." Geography, in other words, is the anatomy of History, just as anatomy is the Geography of Medicine.

Classical physicians, from kind Hippocrates to restless Paracelsus, searched for the secret of disease in the air, waters, and earth. But the invention in our time of "portable" pocket climates has resulted in the relegation of the study of environment to the medical geographer, whereas in reality every physician should be something of an ecologist to be able to understand better his own mental texture as well as the changes in the organic fabric of his patients.

Geography often determines the character of peoples. Coastal, plain, and mountain peoples all have different characteristics traceable to their environment. One can better understand Paracelsus' mystic thought and misty language if one remembers that his youth was spent amid the shivering pines and the fog shrouds of Switzer-

land, and one can better comprehend Avicenna's mental jumps from objective science to sheer fantasy if one recalls the sharp changes from cold to hot in the desert where he lived.

Having a wide vision of the world has given many a humanist—from Luis Vives to Henry Sigerist—the universality of his thought. But when life denies a man who craves universality the opportunity to fulfill his craving "horizontally," by traveling through space, he then seeks fulfillment "vertically," withdrawing into his own spiritual self and drinking from his own inner fountain.

All physicians should travel as much as possible, and always with curious, loving, wonder-filled eyes. For to know the environments and geographies of the world we live in is the best way not only to understand health and sickness in man, but also to explore the mysterious geography of our own soul.

Travel Medicine



With thousands of health-conscious Americans roaming around the world, the physician today is rapidly turning into an international medical expert, asked about hay fever in Belgium, drinking water in Haiti, or the effects of high Peruvian altitudes.

Robert Louis Stevenson once wrote that "to travel hopefully is a better thing than to arrive." True it is, but there is no fun in trudging through the Louvre with unsupported varicose veins, visiting Westminster Abbey while the digestive tract rumbles, or cruising in the Mediterranean wearing what Samuel Butler facetiously called the "holy look" of seasickness.

For the physician who has to answer his peripatetic patients' questions, or who is himself planning a leap into unknown regions, here is *MD's* compact introduction to the new and adventurous branch of Travel Medicine.

Travel Revolution. During World War II millions of middle-class Americans had a taste of foreign travel, afterward many decided to try it for fun. In 1947, 435,000 Americans journeyed abroad; the yearly total has shot upward ever since. Through the lay press this vast *wanderlust*-ing public has been warned that tickets and a passport are not enough. Said *Business Week*: "It's vitally important to discuss a trip you plan with your physician

before you leave. If you don't, chances are that you will wish you had before you get home."

All prospective travelers require proof of smallpox inoculation to be readmitted to the United States. Some physicians suggest added protection against typhoid and paratyphoid fevers, diphtheria, and tetanus for all travelers, protection against more exotic diseases for those headed toward tropic climes.

Physicians record inoculations on an International Certificate of Vaccination, obtainable from any passport office. For vaccines not readily available, such as yellow fever, patient should go to a U.S. Public Health Service clinic or quarantine station.

When traveling with an infant on a trip lasting several days, the formula may be prepared and refrigerated in advance, carried in an insulated bag or dry ice container. Most commercial aircraft carry refrigerators, many stock emergency supplies of canned baby and junior foods as well as pins, diapers, and similar necessities.

Solid canned foods to which the baby is accustomed should be taken along, warmed before opening, and fed directly from the jar. Parents can be advised that babies usually do not eat as much while traveling as they do at home, generally because routine is upset.

When a trip is to last weeks or months, infants must be introduced to an evaporated or dry milk formula several days before departure. As they cannot adjust easily to constantly changing types of drinking water, a large Thermos bottle of home base water can be brought. Otherwise, bottled water obtained en route is the safest bet.

Abrupt changes in a baby's living pattern often make the infant fretful or forthrightly furious. Traveling parents should try to keep to baby's routine, gradually accustoming him to a new day-night cycle.

For older children parents should previously plan several days of activities that simulate the conditions en route. If informed of the trip too far in advance, children may become overly excited, become fretful after trip has started.

Emotionally healthy children welcome travel, easily take a trip in their stride. Neurotic children, or those who have never been away from home before, may become somewhat anxious during a

journey. Such children often release negative feelings through "play therapy" when given dolls in miniature planes, trains, or ships several days before leaving. After prevoyage excitement, a healthy, cavorting youngster may develop a rectal temperature up to 101° F. This is usually no cause for worry.

Needless surgery abroad can be avoided if a traveler who occasionally experiences severe abdominal pains carries a physician's letter describing the condition and any previous exploratory operation. Such persons should obtain X-rays of both gall bladder and kidneys before leaving, facilitating diagnosis in emergencies.

A physician's letter should also be carried by diabetic travelers, noting their type and dosage of insulin, and by travelers who are hypersensitive to penicillin or other drugs.

When asked whether a cardiac patient may fly, physicians can discuss the particular case with one of the medical departments maintained by most major airlines. Cabins of high-altitude airliners are usually pressurized to the equivalent of 8,000 feet. Says Dr. Walter C. Alvarez: "A good axiom is that he whose heart is good enough so that he can walk comfortably on the street can fly in an airplane; he will have enough reserve cardiac strength for that."

Before leaving, prospective travelers should visit a dentist, obtain an extra pair of spectacles, buy spare hearing aid batteries. For those with varicose veins or an old thrombophlebitis, an elastic stocking or bandage will help on the long sight-seeing trudges.

En Route. Despite recent huge increases in tourist traffic, the age-old scourges of travelers—cholera, plague, typhus, relapsing fever, smallpox, and yellow fever—have shown no signs of flaring up. Since World War II these diseases have declined sharply, not a single epidemic has erupted during the past four years as a result of international travel.

Motion sickness, the most ancient malady of traveling man, results from a still little understood combination of visual, visceral, and psychic factors.

One thing is certain, there is no such animal as the "good sailor." Everyone at some time or another will experience the queasiness of motion sensitivity, whether in train, car, ship, or plane. The sailors of Magellan, Columbus, and Drake, though

hardy men, bung over the rail as pitcously as any modern sea traveler who omits to consult his physician on antiemetics.

Curious fact is that motion sickness is totally absent in deaf mutes and those with destroyed vestibular apparatus, is rarely seen in infants. For the rest, the nasty phenomenon affects about 10 per cent of adult sea voyagers (25 to 50 per cent in rough weather), less than 0.5 per cent of adult air travelers, a much higher percentage of children in all types of vehicles. Travel experience decreases the chances of motion sickness, so does age; one recent study showed that travelers over thirty years were 2.5 times more resistant than those in the seventeen to nineteen age group.

The position of a traveler in a plane or ship often determines whether he will become sick. Sea voyagers in amidships cabins are less vulnerable than those fore and aft. A queasy traveler should lie athwart a ship while it is pitching, fore and aft when it is rolling.

On airliners, pilots usually sit on the left side, thus bank in that direction. Passengers seated by windows on the same side, especially immediately aft of the wing, are most likely to turn green. More prevalent in the daylight hours, air sickness occurs most frequently aboard smaller planes such as the two-motored DC-3, is less likely on the larger craft flying above turbulent air currents.

Anti-Motion Therapy. Since the earliest sea voyagers virtually every remedy has been prescribed for motion sickness, ranging from brown paper on the chest to oodles of champagne.

Much less expensive and more effective than champagne are newest antiemetic drugs developed since World War II. One earlier group included several belladonna alkaloids, later surpassed by compounds such as pyridoxine, meclizine, dimenhydrinate, cyclizine.

Diet Directed. For centuries sailors, on diets of hardtack and salt pork, suffered malnutrition and scurvy as well as various "fevers" and "sailor's vapors"—diseases of psychosomatic origin. Chief dietary hazard for the modern sea traveler is not deficiency but overconsumption of food.

Dining facilities aboard large passenger ships are usually scrupulously hygienic; a sanitary log kept by the ship's surgeon includes such minute details as the condition of china and silverware. At

sea, the surgeon personally inspects the galley, water supply, and sanitary installations weekly.

While traveling by rail or road, food obtained in public places should be boiled and easily digestible. Foods easily contaminated with bacteria if carelessly handled or improperly refrigerated include cold eggs, cold meat and fish, prepared salads, stale sandwiches, milk puddings, cakes, and pastries containing moist fillings.

Diet while in motion should be alkaline-forming to improve acid-base balance, high in carbohydrates to prevent ketosis, high in salt to maintain hydration, low in fat to accelerate digestion, low in fluids to avoid gastric distention.

After sitting during a long trip, many older people experience varying degrees of swelling of the ankles and feet, owing to impeded blood and lymph flow. They should stand up and walk around every hour, change position frequently. Constricting garments, especially women's girdles, exert a tourniquet action, restricting flow of body fluids.

"Metabolic Clock." When a traveler flies to Europe he may cross one hundred meridians (*time shift is four minutes per meridian*), thus experiencing time change of a quarter of a day. With 550-to-600-mile-per-hour passenger jets in service, twelve-hour time differences within a single day are common.

After such long distance flights the traveler's "metabolic clock" often behaves as though he were still at home, needs psychic and physiologic adjustment.

This time element can worry athletes, actors, lecturers, and others requiring top mental and physical efficiency. For two or three days after eastbound crossing of five or more time zones, important meetings and events should not be scheduled in the mornings, nor scheduled in the afternoon immediately after long westbound flights.

For the average traveler, a new day-night cycle may affect eating, sleep, and bowel habits. For the physician, the time imbalance can be important when treating patients just returned from long flights.

Commonest indisposition of Americans abroad in any part of the world is a disease of familiar symptoms and many names—Traveler's Stomach, Mexican Tummy, Delhi Belly, Spanish Quick

Step, Hong Kong Belly, the *turistas*, or, more simply, the "G.I.'s."

One study of four hundred Europe-bound American students showed that 5 per cent had amebic dysentery before departure, same number had it when the group returned, yet 50 per cent reported diarrhea while abroad. Most likely countries in which to pick up tourist diarrhea are Mexico, Italy, Spain, and France; least likely are Scandinavia, England, Germany, and Switzerland. Probable cause: toxins from bacteria in poorly refrigerated foods, possibly water-borne organisms. Some observers blame unaccustomed quantities of wine and olive oil; others point out that an oil reaction would hardly be so violent, consider wine an unlikely general cause.

Usual therapy includes paregoric (may not legally be taken out of or into the United States), bismuth or kaolin preparations, rest, and a diet of rice, tea, and apple sauce; the last two for their astringent tannic acid content.

Tropic Troubles. Many once highly dangerous tropic countries in Asia, Africa, Central and South America, and the West Indies have established health programs in the past decade with improved sanitation, mass immunization, and control of insect vectors. Yet malaria, dengue, yellow fever, Chagas disease, and relapsing fever are still endemic in tropical areas visited by Americans.

A stay at a luxury hotel in the tropics often lulls the tourist into a false sense of security about dangers of endemic diseases. In areas where the night-feeding *Anopheles* or *Aedes aegypti* mosquitoes reside, an after-dark walk or beach party can be perilous.

When tourists make trips through malarial country, they should use adequate protective clothing, bed nets, and insect repellents, also take chloroquine during the exposure period. Romantic as native huts may appear from the outside, they should be shunned where insect-borne diseases are endemic.

Travelers to the tropics also do well to avoid milk or water not freshly boiled, meat not thoroughly cooked, sherbet, ices, and locally produced soft cheeses and butter. Also risky are uncooked vegetables, including those in salads and garnishes, thin-skinned raw fruits, melons, custards, puddings, cold pastries, and meringues.

European Travel. Common infectious diseases of western Europe are the same as those of New York, Chicago, or Los Angeles, with a few exceptions. Typhoid and paratyphoid fever still occur in Italy, the Netherlands, Austria, and France, or wherever shellfish is popular.

Malaria and diphtheria have been reduced but not eliminated in the Netherlands and Austria. In Italy, where malaria is now almost eradicated, kala azar is still found in the entire central and southern portion of the hoot as well as in Sicily; brucellosis is common in the southern mountainous regions and Sicily, where goat's milk is consumed.

Fondness of Austrians for sausages made with raw meat keeps taeniasis common. Helminthic diseases, especially ancylostomiasis, also occur in Italy, especially in the suburbs of large cities such as Florence and Bologna where vegetable markets are supplied from family plots often fertilized with human excrement.

Asthma and hay fever are common in Norway, Austria, Belgium, and the Netherlands, where the dust of mattresses or featherbeds sometimes contains sensitizing agents such as mold and dead mites. Timothy grass pollen is common in many European countries. As for the common cold, it is ubiquitous and knows no national frontiers.

In South America, travelers may ride in buses or trains that climb to extremely high altitudes. Some trains carry oxygen and have a physician on the staff. The train from Lima to Huancayo in the Andes runs over the world's highest gauge railroad, reaching 15,693 feet.

Most persons in good health can ascend from sea level to 10,000 feet in a day, stay there without discomfort. Travelers going higher for brief periods are usually not seriously affected; about every other person develops some mountain sickness symptoms when remaining more than twelve hours at 12,000 feet or above.

Symptoms can include headache, irritability, nausea, vomiting, cyanosis, fever, tachycardia, and dyspnea, rarely last more than a day or two.

Quoth Horace some two thousand years ago: "They change their clime, not their disposition, who run beyond the seas." Many neurotic or otherwise emotionally disturbed people view a trip

abroad as a chance to "change everything." While away, they may enjoy the illusion that gnawing psychic dilemmas have been resolved, much as mental patients often improve when a new staff takes over in a psychiatric hospital.

More frequently, the seriously neurotic tourist will be made anxious by unfamiliar foreign customs, whereas the normal tourist finds new patterns of living refreshing.

Future. Next great step forward in travel will see tourists in sealed-cabin, rocket-powered planes hurtling ten or more miles above terra firma at supersonic speeds. Strangest sensation of travelers flying under such subgravitational conditions will likely be a feeling of exhilaration, caused by weight reduction of 20 to 40 per cent.

Last step will be interplanetary travel, when physicians will have to answer a whole new flock of cosmic touristic questions. Meanwhile, with the help of Travel Medicine experts and travel-conscious physicians, the public could well paraphrase Stevenson's dictum as: to travel healthily is a better thing than to arrive.

A Place in the Sun (Editorial)



When summer comes, man loves a place in the sun and the physician can help him to enjoy it.

The human being is a biologic system capable of reacting adequately to new situations or to internal needs. The functional activities of the organism are subject to a periodic rhythm related to external factors and endogenous influences.

Recognition of seasonal rhythms in the reactive capacity of the human organism demands that the physician systematize them into new concepts. Individual responses to summer atmospheric and biosocial factors justify the creation of a new body of knowledge, which might be called "Summer Medicine."

The thirteenth-century compilers of the *Regimen sanitatis Salernitanum* recommended the adoption of special measures in the summer months: "In Summers heat (when colder bath dominion) —Cooler meates and moist are best in some opinion. . . ."

We know today that a "person" is composed of two factors: biopsychic organism and "circumstance." Under the last term the philosopher Ortega y Gasset included the double dimension of space and time. In this sense each person is at once a spatial and a historical being.

The surrounding landscape exerts a powerful influence on "per-

sons' The influence of landscape *color* is a fact. Green and blue (sea and sky), the summer colors, are pleasant and sedative, white (snow) tranquilizing, red and yellow exciting. Landscape *form* also influences us. The plainsman feels confined when transplanted to the valley, while the city dweller sometimes feels an indefinable anguish when confronted with a wide horizon.

Hegel classified landscapes into *highlands*, *valley*, and *coast*. These landscapes are characterized by the relation between earth and water. The highlands are dry. The valley is born of the river. On the coast "trembles the sea," as Dante once said.

In the valley the identification between man and earth is complete, allowing individuality and agricultural races to attain maximum expression. Monotonous nature divorces the highlander from the landscape, rendering him more companionable and creating races of town dwellers and sometimes of immigrants. The coast with its beckoning sea, symbol of mutability, makes men adventurous but lacking in permanent roots.

To the landscape must be added the *climate*. *Meridional* climate has a languishing effect physically while it sharpens man's intuition and instincts, *continental* climate, with its extremes of heat and cold and dryness and wetness, and *coastal* climate, with its strong winds and humidity, have a stimulating effect, artificially created city climate tends to reduce reproductive capacity and increase intellectual life.

To the permanent climatic conditions are added *climatic rhythms* (daily, lunar, and seasonal). Summer, with its high temperatures and intense light, decreases vitality to its lowest.

In homeothermic animals, high *temperatures* dilate the skin blood vessels, cause physical lassitude (hyperthermia, thermal polypnea, tachycardia), and reduce appetite and fur thickness.

Light generally provokes positive phototropic reactions in some birds and mammals. The *weather* acts through its elements: atmospheric temperature and pressure, humidity, light, air ionization. Summer heat induces depression, restlessness, anxiety and insomnia, reduced work capacity.

Man has been described as a "cosmic sounding board," and weather as a cosmic effector mechanism governing organic reactions. Studies (Wheeler) have suggested that each climatic phase

(heat-humidity, heat-dryness, etc.) may stimulate a certain type of historical period. Bonanza years, it is claimed, are "humid," depression years are "dry," dictatorships bloom in "hot-dry" years, and periods of democratic stability are "cool" and "humid."

"Summer Medicine" as a *corpus doctrinalis* can be of positive value to the medical profession. It can be of greater value to man, who in the summer forsakes artificially weathered modern life and renews contact with outdoor life and nature. Instead of being harmful, this should, under adequate medical guidance, restore to *man the joy of living in a place in the sun.*

Marco Medico



The first European who traveled extensively throughout Asia jotted down hundreds of fascinating notes but only tantalizingly few observations on medical practice in the thirteenth century Orient. Even so, the travels of Marco Polo afford a valuable bridge between the medicines of East and West.

The Man. Marco Polo was born in Venice in 1254, the son of a minor nobleman. When he was six his father and uncle traveled to Asia where they met the fabulous Mongol emperor, Kublai Khan, then even more powerful than his predecessor Genhis Khan. On their second trip to Cathay they took along Nicolo Polo's son, then sixteen. Young Marco quickly learned Chinese and Mongolian dialects, also observed that Kublai was annoyed when travelers could not give a detailed description of the places they visited.

Thereafter Marco made diligent notes, so delighting Kublai with his reports that he sent him on official missions throughout his vast Asian realm. Result of these trips was the groundwork for a travel book that ranks among the greatest ever written, is still a bestseller after six hundred years.

Kublai Khan's favor enabled the three Venetians to become rich, also turned them into virtual prisoners: Kublai was so

pleased with the Polos that he refused to let them leave. They finally returned to Venice, mostly by sea, in 1295, where they found that they had been mourned as dead for twenty-six years, had a hard time convincing relatives of their identity. Legendary account is that they gave a fabulous dinner, at which they appeared and reappeared in silk and golden clothes, laden with jewels, finally convinced the doubters.

Marco took a wife at forty-one, fathered three daughters, settled down as a moderately successful Venetian mercant. In 1298 he commanded a galley in one of the sporadic Venice-Genoa trade wars and was captured. He dictated the story of his travels to a fellow prisoner during a year in a Genoa prison. Death came in 1324 at age seventy.

The Travels. Messer Marco was the first Westener to travel through most of Asia, describe China in its wealth and vastness, and recount the fabulous court life at Peking. Until his book, *Description of the World (Il Miglione)*, medieval Europe had heard little or nothing about such places as Tibet, Laos, Siam, Cochinchina, Japan, Sumatra, Java, Borneo, Madagascar, Zanzibar, Abyssinia.

The three Polos began their eastern trek at Constantinople in 1270, traveled thence to Acre via the Persian Gulf. Then they traversed Kerman and Khurasan, went on to Balkh and Badakshan, ascended the Oxus through Wakhan to the plains of Pamir, thence to Kashgar, Yarkand, and Khotan. Except for Marco's account, most of these places remained closed to Western knowledge until the latter half of the nineteenth century. From Khotan the party crossed the Gobi Desert to Tangut, at the extreme northwestern edge of China, and were finally received by Kublai in his summer palace at Shangtu. By this time they had been three years on the road.

As Kublai's envoy, Marco subsequently made land journeys northward to ice-locked Siberia, "where men ride on reindeers or dogsleds while hunting white bears," also visited other parts of Russia. By sea, he traveled southward over the western Pacific to India and the tropical Indies.

Marco's Medicine. European medicine in that period was largely Galenic, with a strong Arabian influence. A basic text was

the Salernian school's *De aegritudinum curatione*, another was the poem *Regimen sanitatis Salernitanum*. Several diseases were classified as 'fevers,' treatment was mostly dietetic or emollient. Psychoses were treated by diet, purgatives, bloodletting, and various drugs, or with pleasant words and calming music. Surgery was mostly external, notably hemorrhoidectomies. Alleged aphrodisiacs and abortifacients were widely prescribed. Marco Polo described for medieval physicians the source of many of their commonly used medications such as aloes, benzoin, camphor, cinnamon, cloves, cubeb, ginger, musk, opium, pepper, rhubarb, brazil.

The period's interest in purgatives caused Marco to pay particular attention to this aspect of medicine during his travels. At Hormuz, in Persia, he described a "wine of dates mixed with spices, which at first causes violent purging, but afterwards works as a fattening restorative."

In the desert area of eastern Persia the little water available was "impregnated with salt, green as grass, and so nauseous that none can use it as drink. Should even a drop of it be swallowed, frequent calls of nature will be occasioned. The cattle, however, are compelled by thirst to drink such as they find, and a flux immediately ensues."

Non medical purgation was described as a custom among the pirates of Gozurat, a kingdom on the west coast of India. When rich merchants were captured they were forcibly dosed with "sea water and a stuff called tamarindi," a cathartic that quickly disclosed "whether the merchants had swallowed jewels or pearls in an effort to save them."

Marco noted that Peking was healthier than some other cities he visited, credited this to the fact that no dead are allowed to be buried or burned inside the city, but are confined to the suburbs with the prostitutes. Here are some other medical notes culled from his voluminous observations.

India. The natives are addicted to the chewing of Tembul (probably betel), which stains their mouths red. 'I have been told that it is extremely conducive to health.'

Yarkand, Chinese Turkestan. The people in general are "afflicted with swellings in their legs and tumors in their throats," a

fact confirmed in 1895 when Sven Hedin reported that three-fourths of Yarkand's 150,000 population was goitrous.

Indian Brahmans and Yogis: Some are reported to live to be one hundred fifty or two hundred "because they take mercury and sulphur twice a month all their lives. Their great age is probably caused by their very abstemious diet."

Tartary: The best musk comes from Tartary and is obtained from the umbilicus of a deer, where "a clot forms in the manner of an imposthume."

Tibet: Many people wear a layer of gold about their teeth. The men are tattooed.

Madras: Dirt from the tomb of the martyr, St. Thomas, is used in curing "a quartan or tertian fever."

Java: A rich country that abounds in "pepper, nutmegs, spike-nard, galangal, cubeb, cloves and all the other valuable spices and drugs."

Persia: They burn ore over a fiery furnace, produce tutty (crude zinc oxide), "which they use in collyrium and eye salves."

Marco Polo also astonished his countrymen with the tale of the powerful leader of the Ismailites who administered bashish to some of his followers (called *Ashishun*) in order to intoxicate them into committing fanatical crimes.

He was a fervent balneologist, noting that in the Armenian province of Erzerum were "the best baths from natural springs that are anywhere to be found." In southern Persia he found many natural hot baths which "have excellent virtues; they cure the itch and several other diseases." Throughout Cathay he was impressed by the fact that everyone bathed at least three times a week, while noblemen had private baths heated by coal.

One strange observation made near the China-Burma frontier was the use of crocodile gall, which "furnishes the material for a most precious medicine." It was used against the bite of mad dogs, as an obstetrical stimulant, and for several dermatoses.

In India, Marco observed some of the religious beliefs, superstitions, and alchemy that composed the ancient Ayurvedic medicine, said to have been inspired by Brahma. Sulfur and quicksilver were the two basic elements of the Ayurvedic pharmacopeia, still used in Hindu medicine.

Maddeningly silent was Marco about his own illness, which detained him for a year in Central Asia. All he noted was that he owed his recovery to the pure air in the high mountains, enough to cure "any kind of fever or other ailment that may hap."

Many of Marco's tales were not believed in his time, in fact telling a lie became known as "telling a Marco." Centuries after his death, Venetian masques always included an individual who assumed the character of Marco Millionini and told Munchhausen-like tall tales. When asked on his deathbed to retract his stories, Marco Polo replied: "I have not told half the story."

Sun and Water



*The annual sacrament of sea and sun,
Which browns the face and heals the heart . . .*

—Robert Penn Warren: *End of Season*

In the beginning there was the sun, and a portion thereof flew off into space to become the earth, and the surface of the earth was at one time all water. So it was three thousand million years ago, some say, and out of the stupendous chemistry of the sun and the water were formed the first living molecules.

From the first con of creation, sun and water have played complementary roles in the development of the life-sustaining earth known today: the sun as the source of energy for photosynthesis, water as the primary ingredient of all organic matter. From the beginning of civilization, sun and water have also been focal points in man's growing consciousness. For the cosmically minded physician, *MD* here examines more closely these two elements of life.

Antiquity. Sun worship dates back to the new stone age, the worship of water is probably equally ancient. In early Egyptian records, the sun-god Ré is the father of Osiris, who is himself closely associated with the Nile River, on which Egyptian civilization depended. When worship of the sun-god (Aten) became a state religion (c. 2700 n.c.), the cult of the Nile also developed into an exquisitely intricate ceremonial.

In nearby Mesopotamia, the Sumerian and Babylonian civilizations centered around the Tigris and Euphrates rivers, as this old incantation shows:

*O thou River, who didst create all things,
When the great gods dug thee out,
They set prosperity upon thy banks.*

The sun-god, frequently associated with water in some form (river, lake, sea), was worshipped in such far apart communities as those of the Hindus, aboriginal Australians, some African and American Indian tribes, Persians, Greeks.

In spite of the immense diversity of detail, the ceremonial of many diverse peoples is essentially a re-enactment of the drama of creation, in which sun and water were the primordial forces. In a half million years as a wandering food-gatherer, man seemed to remain sunk in brutishness; in a few thousand years from the start of agriculture, his intellect flowered at a stupendous rate. In that sense, sun and water combined can be termed the very creators of civilization.

Early Therapy. Early medicine had few more potent or highly respected weapons than sun and water. In ancient Mesopotamia, medicine created a system based on actual and symbolic use of fire and water. In Greece, the temples of Aesculapius (son of Apollo, God of Sun, Medicine, and Music) were constructed so as to receive the maximum sunlight; water was readily accessible.

Hippocrates observed that water had several notable effects on the body: he urged the use of cold water to allay fever and pain. Both Greeks and Romans took daily sun baths. The solarium was part of every Roman dwelling; Roman baths became famous for their health-giving aspects, notorious for their social life.

Greek and Roman physicians were well aware of the therapeutic values of mineral springs: both Celsus and Galen recommended baths and massage for a variety of illnesses. Medical dilettante Celsus placed great faith in hydrotherapy, was probably the first to write at length on the subject. Wherever Roman legions went, they pounced on local thermal or mineral springs, erected elaborate bathing establishments at Bath (Aqua Solis), Aix, Baden-Baden, St. Moritz.

Though the use of sunlight for curative purposes lagged behind

the use of water, Greek, Roman, and early Arabian physicians flirted with heliotherapy. The historian, Herodotus, noted that sun baths were most healthful and beneficial. Many lesser Greek and Roman physicians were enthusiastic in prescribing heliotherapy, for some it became a virtual panacea. Antyllus (second century A.D.) and Galen (c. 129-200) ordered practically every patient who consulted them to sprawl in the sun for hours on end. Later, the prince of Arab physicians Avicenna (980-1037), the Arabian Galen, held that sun bathing was a specific for nearly every known disease and that it gave the healthy an immunity to all distempers and forms of infection.

Hydrotherapy. After many centuries of neglect, hydrotherapy began to flourish once more around the Renaissance. As early as 1424 Michele Savonarola recommended cold baths, as did Christopher Barzizio (1450). Two centuries later the popularity of the bath as a therapeutic measure had spread to England; Sir John Floyer's (1649-1714) *Inquiry into the Right Use of the Hot, Cold and Temperate Baths in England* went through eight editions between 1697 and 1722. In Germany, Johann Sigmund Hahn (1664-1742) constructed an entire therapeutic system on the use of water both externally and internally, expounded in the work *Psychroluposia*.

During the early nineteenth century, the best known advocate of hydrotherapy was the Silesian farmer Vincenz Priessnitz (1799-1851), sometimes called the father of hydrotherapy. Priessnitz proclaimed the appealingly simple doctrine that it was possible to bathe one's way to health, set up outdoor baths in a sylvan setting, put wealthy clients on a rigorous regimen of cold baths, massage, and chopping wood. In 1829 when he opened for business, he treated only forty-five patients, by 1843 he was averaging fifteen hundred per year.

A few years earlier some physicians recommended hydrotherapeutic measures in certain illnesses: William Wright (1735-1819) revived the ancient custom of using cold water to assuage fever, and James Currie (1756-1805) was an ardent practitioner of this method. Early Philadelphia physician Benjamin Rush (1745-1813) also urged cold water treatment for many patients, applied ice bags to those with fever.

Toward the end of the eighteenth century the old Roman town of Bath regained its ancient popularity and prosperity as a center for the treatment of gout and rheumatic disorders; in the early years of the nineteenth century it was probably the most popular resort in England.

Though Paracelsus (1493-1541) had analyzed the springs at St. Moritz as early as the sixteenth century, probing the content of allegedly medicinal waters did not become a popular pastime for physicians until the close of the eighteenth century. The first to make systematic studies of English mineral waters was Thomas Garnett, who also analyzed such factors as temperature and time of exposure. During the nineteenth century, when old springs and spas soared to new heights of popularity, their water was analyzed in an effort to ferret out active principles; as fast as new springs were discovered physicians and chemists rushed to test them. Principal ingredients found were: sodium, magnesium, sulfur, calcium, and iron with traces of arsenic, lithium, potassium, manganese, bromine, and occasional iodine.

So popular was the water cure that many enterprising operators thought of bottling therapeutic waters; some manufactured their own, imitating naturally occurring waters.

Among those who could not afford or did not care to journey to a spa for a cure, "taking the waters" became a fashionable pastime. Still available, but less popular and fashionable than formerly, are both natural and artificial spring waters.

The last few decades saw a decline in the popularity of spas and hydrotherapy generally. The most widespread use today is in dermatologic and rheumatoid conditions. Alkaline baths are still sometimes recommended for mild skin affections; sulfur baths are used for scrofula, psoriasis, arthritic and rheumatoid conditions. Some clinicians believe that carbonated baths are helpful tonics in heart diseases.

The chief physiologic effect of the application of cold water is constriction of the peripheral blood vessels, resulting in pallor and chilliness. Heat elimination via perspiration especially is diminished, while internal temperature, pulse, and respiratory rates rise noticeably. Reaction, beginning immediately and usually complete within twenty minutes, includes dilatation of peripheral vessels,

reddening and warming of the skin. The patient feels relaxed; internal temperature, pulse, and respiration drop. Moderate heat relaxes surface vessels, producing an almost immediate sense of physical well-being.

The hyperpyrexia effects of hot baths are: pulse and respiration are increased; blood flow is accelerated; hemoglobin and red cells are increased; the hemopoietic system is stimulated; the white cell count rises. In a normal individual a bath that raises the temperature to 101° F. when followed by a one hour's sweating will raise leukocyte count by about 3,000, the increase subsiding to normal in about two hours. Blood sugar, nonprotein nitrogen, urea, and uric acid also increase, but frequently drop below normal after the temperature falls. The urine becomes more concentrated, usually more acid, with an increase in urates and phosphates.

A virtue of hydrotherapy in the treatment of rheumatoid, arthritic, and poliomyelitis victims is the buoyant effect of water. Weak, atrophied, or partially paralyzed limbs can be exercised underwater with much greater ease than in the air. The expenditure of energy and cardiac effort required for underwater exercise is so low that severely debilitated patients usually have little difficulty.

Full immersion baths are used today for patients suffering from muscular fatigue, peripheral neuritis, osteoarthritis, chronic gout, myositis, fibrositis, hypertrophic spondylitis, spastic constipation, spastic colitis, and pylorospasm. Warm baths are also recommended in cases requiring elimination of systemic poisons, as a palliative for colic produced by cholelithiasis, as an adjunct in general or cerebral arteriosclerosis, as a provocative technique in locating a focus of infection, and for the treatment of low-grade infections.

A warm bath followed by a cold one is sometimes used as a tonic adjunct for patients suffering from low blood pressure, amenorrhea, anemia, and chlorosis. Cold sitz baths (first introduced by Priessnitz) have been recommended as a general stimulant for appetite, as auxiliary treatment in atonic constipation, biliary atony, and impotence. Hot sitz baths are used for urinary tenesmus, spasmodic dysmenorrhea, and chronic pelvic congestion.

Whirlpool action (i.e., continuous agitation and circulation of the water), introduced during World War I, enhances the physiologic activity of hot water. Agitated water seems to be hotter than

still water, there is more pronounced reddening, apparently also it has an important anesthetizing effect upon immersed parts. It is used in the treatment of lesions of various kinds (callus deposits, periosteal, syphilitic, and tubercular lesions), ulcers, and cicatrices; as a preliminary to massage, vibration, manipulation, passive exercise in rehabilitation procedures.

Heliotherapy. Following Sir Isaac Newton's discovery of the solar spectrum in 1666 there was a renewal of interest in the properties of sunlight, and as early as the latter half of the century a few physicians reported the use of sunlight in the treatment of ulcers. During the early nineteenth century, C. W. Hufeland (1762-1836) used sunlight in treating rachitis. Florence Nightingale, during the Crimean War, observed that the wounded exposed to sun fared better than those in dark wards. By 1877 scientists had noted the bactericidal power of sunlight, although it was then believed that free oxygen was necessary for sterilization; in 1892 Marshall Ward definitely established that the germicidal properties of sunlight came from the ultraviolet rays.

In 1890 a British practitioner published a paper reporting that the chief factor in the cure of rickets was sunlight, but the study was practically ignored by the medical profession at the time.

Scientific heliotherapy (or actinotherapy) began near the turn of the century. The Danish physician Nils Ryberg Finsen in 1897 published *The Treatment of Lupus Vulgaris by Concentrated Chemical Rays*, advocated the use of sunlight in treating smallpox patients, reporting that light could change a vesicle into a pustule.

During these same years the Swiss physicians Rollier and Bernhard, working independently, discovered that sunlight promoted the healing of tubercular and other types of lesions. In 1919 Huldehinsky published reports on the use of actinotherapy in the treatment of rickets, and during the 1920's Steenbock and others discovered that ultraviolet rays could convert ergosterol to vitamin D.

The most active therapeutic elements in sunlight are the ultraviolet rays (comprising about 7 per cent of the total reaching the earth). Their main action is on the superficial layers of the skin, though some (especially the longer ultraviolet rays, from 3,200 to 3,900 angstroms) reach into soft tissues. Indications are that

the primary chemical and physical changes that make sunlight beneficial take place in the outer layers of the skin.

The first effect of both ultraviolet and infrared radiation (which makes up about 93 per cent of the sun's rays) is erythema, followed by pigmentation of the skin, the precise amount of pigmentation depending on the race, complexion, sex, and constitution of the individual.

Among physiologic effects of ultraviolet radiation: marked increase in serum globulin, leukocytes, erythrocytes, blood platelets; there is also an increase in the elimination of chlorides and phosphates, an increase in appetite with some drop in body weight.

Ultraviolet radiation, either from natural sunlight or from artificial sources, is today used to treat various forms of acne and eczema, neurodermatitis, and the tuberculodermas. It is also used in certain types of asthma, as an adjunct in most types of tuberculosis, and is still specific for the treatment of rickets.

Incidental uses include: diagnosis of tinea capitis, superficial circulatory difficulties by ultraviolet light; disinfection of nurseries, washrooms, operating theatres; to increase the production of penicillin by the mold *Penicillium notatum*.

Sun Worship. Modern sun cults followed close on the heels of the revelations of the therapeutic value of sunlight, reached mass proportions in the decades following World War I.

Among the earliest and most ardent modern sun worshippers were the Germans, who flocked in naked droves to the *Nacktkultur* movement. From there the cult, either as "nudism" or coupled with faddist notions about eating, exercise, sleep, and sex, spread to other lands, and by the 1930's there were hardy clusters of nudists in practically all Western countries, with the Germans, Scandinavians, Dutch, Austrians in the fore.

The Future. Since man has unleashed the atom, many scientists have hopefully predicted that the world may at any moment enter on a golden age, the limitless energy of the sun and stars being available to man in its rawest form. Most recent advances in nuclear physics at least make possible in theory the tapping of the vast stores of hydrogen in sea water as a source of fuel.

Less sanguine observers note that the sun itself is apparently in the midst of a hotter cycle, causing a shrinkage of polar ice caps

Health and Leisure



The wisdom of a learned man cometh by opportunity of leisure; and he that hath little business shall become wise.

—Ecclesiasticus

A people long dedicated to the gospel of work, Americans now find themselves with time and money on their hands; never in history has so much leisure been enjoyed by so many.

In 1800, the average wage earner toiled fourteen hours a day, six days a week. In 1900 the work week was still sixty hours. But today's average citizen divides his waking hours almost evenly between work and leisure; tomorrow's man will enjoy even more time for his pursuit of leisure. For physicians, concerned with the whole man, the changing pattern of this systole-diastole rhythm of work is a part of medicine, and MD here presents a few data on the phenomenon of human leisure.

Background. Webster defines leisure as "time at one's command." Since leisure occupations are those of choice, the use to which free time is put offers intriguing clues to the personality of both individuals and social groups.

Primitive leisure reflected concern with the basic questions of life and death. Dances and ceremonials revolved around birth, puberty, marriage, death and burial, war, harvest; art was most often expressed in elaborate decoration of shield, spear, and cook-

ing pot. Oddly, primitive leisure developed under two opposite conditions of man's early struggle. For some tribes, it was the fruit of easy living in favorable climes, for others it grew out of enforced idleness in seasons too cold for hunting.

Greek civilization brought the first full flowering of leisure, it produced men like Aeschylus, Sophocles, Euripides, Plato, Aristotle, activities such as drama, music, oratory, poetry, and athletics. The stress was on intellectual pursuits. *skhole*, the Greek word for leisure (or philosophy), is the origin of "school."

Physical training was often done to the accompaniment of the lute. Athletes were amateurs who sought physical perfection for its own sake. The right to such recreation was restricted to male citizens, at the peak of its glory Athens numbered 20,000 citizens to 180,000 aliens and slaves.

The early Romans achieved leisure by rising at dawn and working until noon, the afternoon and evening were given over to recreation. In a slave-based economy, the pursuits of leisure gradually degenerated, Romans became spectators instead of participants and the rough sport of the Colosseum turned into sadistic orgies of torture.

Leisure in the Middle Ages revolved around thirty to forty church holidays a year. The Guilds invented the "three eights" principle: eight hours of work, eight for leisure, and eight for rest.

An ascetic reaction set in with the Reformation. Life then became something to be endured but not enjoyed, the watchword was "work for the night cometh when no man can work." So strong was the Puritan spirit in England that Parliament closed all playhouses, turned playgrounds into sheep pastures, and in 1647 forbade the observance of Christmas.

Americana. Early Americans were strongly influenced by Puritan ideals, Anglo-American literature and folklore are studded with epigrams that praise work and denounce play.

A harsh view of leisure was expressed in the bylaws of an American Methodist college in 1792: "We prohibit play in the strongest terms. Let this rule be observed with the strictest nicety, for those who play when they are young will play when they are old." The college did permit gardening, walking, riding, bathing, but even those activities were approached in grim earnest and

hedged around with the strictest rules: "A master shall always be present at the time of hathing. Only one shall bathe at a time, and no one shall remain in the water above a minute."

Charles Dickens found a depressing sobriety when he visited America in the 1840's, was especially horrified by the American meal. Said he: "No conversation, no laughter, no cheerfulness. Every man sits down, dull and languid; swallows his fare as if breakfasts, dinners and suppers were necessities of nature never to be coupled with recreation or enjoyment; and having bolted his food in a gloomy silence, holds himself in the same state."

The national conscience of that period equated pleasure, leisure with sin. Henry Ward Beecher attacked all entertainers as "moral assassins," warned that a special torment would punish their crime: "As borne on the blast thy guilty spirit whistles towards the gates of hell, the hideous shrieks of those whom thy hand hath destroyed shall pierce thee—hell's first welcome."

Despite such strictures, many Americans found outlet in play. In the cities, theatres, minstrel shows, dance halls, concert-saloons, beer gardens, and amusement parks were all well established by the middle of the nineteenth century. Country people combined work and recreation; log rollings, barn raisings, quilting parties, hog killings, and corn-husking bees became occasions for huge dinners followed by dancing; camp meetings and revivals served both a religious and a recreational purpose.

A Chautauqua entertainment emerged a little later as "a cross between camp meetings and county fair": the recreation was usually thinly disguised as education and moral uplift. A "lecture" accompanied every program; the lecturers included such men as P. T. Barnum, Horace Greeley, Mark Twain, James Whitcomb Riley, William Jennings Bryan, and Presidents Grant, Hayes, Garfield, and McKinley.

Chautauquas sometimes lasted for days; one typical program included a bit of opera, some light music, and storytelling by "five winsome Dixie girls," a special attraction billed as "County Fair—Hey, Skinnay! C'm On Over!" and a rousing speech by a "platform giant."

In the 1920's, the nation threw off pretense, indulged in frank, sometimes frantic recreation. It was an era of mass manic exhi-

bitionism, of hip pocket flasks, marathon dances, "bunion derbies," and flagpole sitting. Height of flagpole-sitting craze was achieved at Baltimore as thousands gathered to gape while Shipwreck Kelly sat on a pole for twenty-three days and seven hours. The bunion derby epidemic reached its peak in 1928 when 274 contestants set off from Los Angeles to walk across the country.

Along with fads and crazes went changes in leisure that exerted a real influence on American life. Science and industry freed women from much household drudgery, allowed them to join the men in recreation. Radio and movies gave a huge impetus to mass culture in the 1920's; automobiles made travel cheap and easy. Auto registration jumped from seven million to twenty-three million in a decade; cars were owned by people who could not afford bathtubs.

The final influence in shaping American leisure was the depression. Wage and hour laws reduced the work week; relief projects resulted in thousands of new playgrounds and recreation areas. As times improved, millions took up golf, skating, tennis, other sports, and hobbies.

Leisure Today. About 10.5 billion dollars a year is nowadays spent for strictly recreational goods and services; more than forty billion a year goes for leisure in its broadest sense. Catering to leisure needs is an industry that employs more than a million people.

An increase in middle class incomes accounts for much of the growth of leisure. Over 60 per cent of American families today have a real income of three thousand to ten thousand dollars a year, compared with only about 29 per cent in 1929.

Leisure time available to the average American is variously estimated at two thousand to three thousand hours a year; as much as one-third of it is taken up with the national habit of "joining" groups and associations.

A paradox is that those at the top of the economic ladder now enjoy less leisure than those on the middle rung. One survey revealed that the average top corporation executive puts in a sixty-hour week; he takes work home with him four nights out of five, is liable to suffer hypertension and peptic ulcer among other consequences of a harried life.

Middle-class leisure is closely linked with the colossal growth of suburban life. One result is the growth of gardening, now the

nation's leading leisure pursuit with more than thirty million adherents; at least eight hundred million dollars is spent every year on seeds and flowers. Another aspect of suburban leisure is the brisk business in backyard barbecue pits and small swimming pools: about 180,000 persons own pools; the barbecue pit is standard equipment for millions of homes.

But many Americans still sbum the use of leisure time as a period of unabashed relaxation. Devotees of the immensely popular do-it-yourself movement now apply 75 per cent of the paint used in the United States, bang 60 per cent of the wallpaper, lay half of the asphalt tile. Sedentary office workers appear to find both physical and psychic relaxation in a variety of handicrafts.

The meaning of leisure to the individual may lie less in the form of activity than in the spirit in which it is approached. Novelist Mark Twain expressed this neatly in his classic *Tom Sawyer*:

Forced one day to whitewash a fence, young Tom concealed his chagrin, pretended that he found whitewashing fun when his playmates gathered to jeer and console. Presently, Tom was watching while the others worked; he had traded the "privilege" for "12 marbles, a piece of blue bottle glass to look through, a key that didn't unlock anything, a tin soldier, a couple of tadpoles, six fire-crackers, a brass doorknob, a dead rat and a string to swing it with, a dog collar—but no dog, four pieces of orange peel," and other treasures.

Commented Twain: "If [Tom] had been a great and wise philosopher, like the writer of this book, he would now have comprehended that work consists of whatever a body is obliged to do, and that play consists of whatever a body is not obliged to do."

Teleleisure. The most significant single factor in American leisure today is undoubtedly television. The firm of A. E. Nielsen reported recently that television set owners watch an average of six hours a day; the "average" is distorted by the fact that the bulk of the looking is done by 25 per cent of the population who are confirmed addicts: this group watches fifty-six hours a week; others, from seventeen to thirty hours.

A study in Toronto, Canada, recently described a new syndrome of "TV legs" among children allowed to do too much watching. The children lacked flexibility in the legs and lower back, showed

weaknesses in arm and abdominal muscles, and developed numerous postural defects. Of three hundred children tested, 55 per cent failed to meet the minimum physical standards, 85 per cent failed the maximum standards, half the boys could not do a single push-up.

Contrary to the outcries of many, television has not destroyed an interest in art, reading, serious music. Attendance at concerts, ballets, and opera has nearly doubled in the last ten years: about two thousand towns and cities regularly offer serious music to their inhabitants.

Only 17 per cent of American citizens are currently reading a book, compared with 55 per cent in England, but interest in books is steadily rising. Amateur painting is enjoying a boom; there are now about three million amateur artists, compared with 500,000 before World War II; some twenty million persons are now studying music.

Interesting sidelight is the slow comeback of the piano, once a main feature of the American parlor; piano sales in a recent five-year period increased about one-sixth. Musical leisure also includes enthusiasts of high-fidelity instruments, many of which are lovingly built at home. Physicians are among the leading hi-fi fans; the pastime is well suited to those who have acquired both a cultural background and a high level of manual skill.

Sport-leisure. Interesting development in recent years is that almost all spectator sports have suffered reduced attendances (an exception is horse racing, where the lure is gambling) while participation in sports is enjoying an enormous growth.

Fishing and howling claim 20 million adherents each; there are 18 million cyclists, 17 million roller skaters, 12 million hunters, 8.5 million tennis players, 4.5 million golfers. Golf is the fastest growing sport; it is now part of the sports curriculum at more than 96 per cent of the nation's colleges and high schools.

Cycling received an important boost when Dr. Paul Dudley White described it as good therapy for circulation, digestion, and nerves, and a useful aid in weight control. In Denver, a city much conscious of Dr. White's role as heart physician to President Eisenhower, bicycle sales shot up 50 per cent after his endorsement.

Another cycling enthusiast is Shane MacCarthy, executive

director of the President's Council on Youth Fitness. He describes it as "wonderfully adaptable developmental exercise, gratifying recreation, convenient travel, zestful sport"; he has advocated roping off New York's Fifth Avenue on Sundays for the use of cyclers and roller skaters.

Another fast-growing realm of leisure is boating. Almost half a million new boats take to the water every year; the ranks of amateur mariners grew 129 per cent between 1947 and 1956. Psychologist and motivational researcher Ernest Dichter believes that Americans view a boat as synonymous with calm and peace, an object of attainment associated with the pleasant memories of one's first childhood experiences with a toy sailboat.

Dichter adds an element of exclusive "in-group" appeal, says that the boat owner "wants to belong to a leisure club, either imaginary or real, rather than to a leisure class." Another aquatic form of leisure is skin diving, which today boasts about 1,500,000 adherents.

Travel-leisure. When not otherwise occupied in leisurely pursuits, Americans travel. The average person travels about 4300 miles a year, three-fourths of it by automobile. About 750,000 Americans visit foreign countries every year; the annual travel budget amounts to thirteen billion dollars. Tourism for many states is a principal industry; the state and national parks and forests attract more than 200 million visitors a year.

Travel vogue has led to the new branch of "Travel Medicine." Ships and airlines maintain well-organized medical departments; inoculation records have been standardized by international agreement; medical advice helps to ease the traveler through many health-and-travel problems.

In the growing leisure class of older people, a recent magazine poll of persons over forty (74 per cent were women) found that the chief leisure interests were traveling, reading, gardening, sewing, and bridge. A study of retired people in St. Petersburg, Florida, revealed this pattern of leisure: first, rest and relax; second, travel and dabble in several hobbies; within a year or two most people settle into a single hobby or part-time occupation.

Pursuit of Leisure. A poll organized in 1934 by the National Recreation Association revealed that American people in that

year spent their leisure in the following activities: reading, listening to the radio, going to the cinema, visiting, riding in automobiles, swimming, writing letters, conversation. The leisure activities they looged for in those days (the poll found) were: tennis, swimming, boating, golf, camping, gardening, playing music, theatre-going, ice skating.

In two short decades, the American middle class has achieved all these ambitions, and added several other leisure activities that used to be the prerogative of the rich leisured class, e.g., travel abroad.

The leading question posed today is whether Americans are enjoying true leisure or are engaged in what one magazine called "the fraotic race to take it easy." Here are some represcotative views from medical and lay circles:

Dr. Karl Menninger, psychiatrist: "If it were economically possible, beginning tomorrow, to relieve every man in the United States of half of his present work requirements, the nation would be in peril. It would be absolutely impossible for the great majority of these people to utlize the suddenly acquired leisure in any psychologically satisfactory way. Some of the energy would be taken up in play but most of it would be expressed in direct aggressiveness or in self-destruction. People would begin fighting, drinking and killing themselves and one another."

Anthropologist Margaret Mead: "Americans are afraid of leisure time. . . . We must stop being scared of the prospect of increased leisure."

Professor Sumner Slichter (Harvard): "Most meo are oot prepared to make good use of large and sudden additions to their leisure."

Author-lecturer Clifton Fadiman: "It doeso't take a psychologist to predict that if we try to fill this leisure time by putting a small white ball into a slightly larger hole or gawking at televisioo crooners, we will as a people go quietly or noisily nuts."

Robert Bendiner (*The Reporter*): "Right now it is business that is selling the life of leisure, and the life of leisure that business can sell is necessarily a life of Aqualungs, outboard motors, Skotch Koolers, and house paint—all good in their way, oo doubt, but

none of them suggesting for a moment that there was more to Greece than marathons and more to Rome than baths."

Twentieth Century Fund Annual Report: "An obvious result of the new leisure in the United States has been, disconcertingly enough, a new measure of uniformity. It seems that in their free time men and women tend to do the same things, to buy the same goods, to watch the same television shows. Apparently it is the dream of all to move into a few states favored with mild climates, and there to pursue the same pattern of outdoor living—preferably *gracious outdoor living*."

Two facts emerge from a mass of literature on the new age of leisure: (a) leisure is considered to be a social problem; (b) communities should be required to organize leisure activities for their members.

As defined by James C. Charlesworth, president of the American Academy of Political and Social Sciences, the emphasis on leisure in the future should be on "pride-of-doing, togetherness, human understanding, creativity and development of the mind and spirit."

Established in 1955 in Chicago was the Center for the Study of Leisure, under a grant from the Ford Foundation. Its activities include research in the kinds of leisure and style of life patterns in the expanding suburbs; a study of industrial workers' attitudes towards leisure; a study of the role of mass communications media in leisure activities; an examination of mass phenomena such as fads and the role they play in leisure.

Said the Center's research director Rolf B. Meyerson: "The mere fact that we consider leisure a problem indicates that our world doesn't provide us with very rigid norms on how to spend it. This is of course true of most other general areas; as a matter of fact, I suppose that aside from polygamy, various universally accepted crimes and sins, and certain political actions, there are very few things which Americans are actively enjoined from doing. There is no one way of bringing up children, of building houses, or praying—or not praying. If in these things variation exists one might expect that in far more trivial matters, such as what kind of cigarette to smoke, what sort of clothing to wear, or how to spend one's leisure time, an enormous amount of diversion is found."

Mental Leisure. Inherent in the so-called leisure problem is

the notion that men and women must do something in their leisure time, whether in gardening, sport, handicrafts, travel, reading, or watching television. The idea that leisure time might be spent in doing absolutely nothing, commonly called loafing, appears to be repugnant to the American mind.

Wrote Dr. Peter Neubauer, director of the Child Council Development Center (New York City): "The idea of loafing has different connotations for everyone. Does it mean the ability to just enjoy things as they come? Taking it easy? Discussing, reading, golfing, sailing? Some people enjoy leisure by going to museums or concerts. Others by thinking, yet others by not thinking—by playing tennis or sitting on the sidelines and watching others play."

Loafing can be the testing of new ideas simply for pleasure intellectual or physical ideas. Actually, many people do work hard at play—but it is still play if it is merely trial and does not have to succeed. Work is highly organized. One must succeed at it, one must get ahead. But loafing, or the use of leisure time, does not necessarily have to accomplish anything.

Recommended by Dr. Neubauer as guides to art of loafing are these rules:

- 1 Hobbies should be regarded as hobbies, not as means of enhancing one's ego or social status.
- 2 Exercise or sport should be considered an adjunct to individual health, not a compulsory activity which requires competitiveness.
- 3 Eschew regular recreation periods, i.e. the "must have-fun" compulsion.

Against this concept of relative individual freedom stands a growing body of opinion that the average American citizen is incapable of finding a good use for his leisure. A professional elite of "recreationists" is being trained in various organizations to show their fellow citizens how to enjoy their leisure to the full. For those who heartily dislike conformism and regimentation this new discipline bodes little good.

Summing Up The Roman poet Quintus Ennius wrote "He who does not know how to use leisure makes more business of it

than there is business in business itself." For the physician who has to advise a patient on leisure, there is wisdom in not building a social problem out of an individual enjoyment.

Ballet of Death



Odious to some, inspiring to many, the bullfight is the twentieth century's last link with ancient gladiatorial contests between man and wild beast.

At least two thousand years old, it has slowly evolved from a contest of brute cunning and strength into a spectacular ritual seen by millions of people in Europe and the Americas every year, some of them paying as much as three hundred dollars for a ringside seat.

History. The bull was worshipped as a deity by the Sumerians some five thousand years ago, later became a central myth of Mithraic religion. The bullcult (Golden Calf) played a part in the early biblical forms of worship. In Greek mythology, Jupiter took the shape of a bull to rape Europa; the union of King Minos' wife with a bull produced the fabulous Minotaur. Bulls were regarded as the highest sacrificial offering in several southern Mediterranean cultures.

Several centuries B.C., Spaniards (Celtiberians) used bulls in trials of bravery; in 228 B.C. they stampeded a herd of wild bulls to defeat Hamilcar's army. The fame of Spanish bulls having been established, Julius Caesar presented bullfights to Romans in the first century B.C., was followed by Augustus who built the Statilus Taurus for spectacles called *taurilia*.

First organized Spanish bullfights were recorded in the twelfth century, the early bullfighters being noblemen who fought on horseback, assisted by peons on foot armed with capes and assorted hardware. Various Popes banned the fights. Pope Sixtus V in 1586 forbade the clergy to attend. King Philip II protested "The fiesta is in the Spanish blood, and we cannot take it away without serious repercussions."

After Philip V in the eighteenth century discouraged his courtiers from participating, the nobility lost their hold on bullfighting, gradually the peon foot assistants became the matadors while the horsemen remained as minor actors. Today, the heart of bullfighting still beats in Spain, though *corridos* are held in Central and South America, France, Portugal, and Mexico.

The Ritual Essential maneuvers in a bullfight are (1) tire the bull by making him run, swerve, toss his massive head, also by wounding the neck muscle, (2) kill him by a sword thrust through the aorta. Preliminary refinements consist of cape flourishes to determine the bull's idiosyncrasies in attack.

In a modern bullfight, three matadors kill two bulls each. Each matador has a team (*cuadrillo*) of two mounted pikemen (*picadors*) and three or four *banderilleros*, who stick garlanded barbs in the bull. The fight (*lidia*) is divided into three 'acts' or *tercios* (thirds).

In the first act, the matador and *banderilleros* perform the preliminary cape work, carefully noting which horn the bull favors. Then the *picadors* enter the ring mounted on decrepit, blindfolded, heavily padded horses. When the bull charges them, the *picadors* inflict a shallow pike wound at the junction of neck and shoulder blades, the first drawing of blood.

The second act belongs to the *banderilleros*, who incite the bull to charge them, then skillfully plant three or four pairs of festooned barbs in the beast's shoulders (sometimes a matador will do this himself). The 3-cm. barbs are placed in predetermined positions to offset a bull's tendency to use one horn more than the other.

The final act opens with the *faena*, a series of dangerous maneuvers by the matador alone, using the *muleta*—a heart-shaped piece of red serge draped over a short pole. Red color was chosen to hide bloodstains. Bulls are color blind. Over the centuries, mata

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dors have invented ballet-like movements to make the bull charge past, whirl around, hook with its horns, all within a few inches of their skin.

Some matadors maintain a majestic, haughty technique, others indulge in dangerous clowning such as pulling the bull's tail, leaning an elbow on its lowered forehead (called a *teléfono*), patting a horn; a few have deliberately turned their backs on the beast, or looked away as it charged past. Each hazardous pass is greeted with roars of *olé,olé* from the crowd.

In the final "moment of truth" the matador is armed with a 75-cm. blade curved at the tip to facilitate penetration through the bony structures; grooves along the blade (a modern refinement) cause an open wound, accelerate the aortic hemorrhage. The perfect kill is virtually bloodless; more often a punctured lung will cause hemoptysis.

The last acts are not always perfectly executed. Clumsy matadors have had to plunge their sword in numerous times, or have run for their lives from a last-moment surge of the beast's fury. For an artistically performed *faena* the matador will receive an ear or two of the bull, be showered with money, flowers (sometimes ladies' lingerie); for a bad fight he can be mobbed, fined, or thrown in jail.

The Matador. A great matador reaps lavish rewards, bull ring impresarios pay him huge sums, poems and statues celebrate his feats, beautiful women beg his favors, adoring *aficionados* follow him everywhere. Average fee for a good matador is four to five thousand dollars a performance. Manolete made \$250,000 yearly from Mexico City fights alone. Wrote tauromach Ernest Hemingway: "It is impossible to believe the emotional and spiritual intensity and pure, classic beauty that can be produced by a man, an animal and a piece of scarlet serge draped over a stick."

The successful matador is rarely fearless, anxiety usually baunts him before a *corrida*. Hours before his death in 1947 from a goring, the famous Manolete told a *Life* photographer: "We toreros are one person before the fight and another afterwards. If you're looking for a handsome torero, take the photo after the *corrida* when the resemblance goes back into place. Fear puts a mask on us now."

The Bull. The fighting bull is a wild animal said to be partly descended from the urus or aurochs a two thousand pound ferocious Neolithic horned beast that roamed over Spain and Europe. Prehistoric drawings of these animals have been found in Spanish caves.

Breeders raise fighting bulls today on large ranches where they range freely, have few contacts with men. They weigh about one thousand pounds, have a thick, tough hide, strong horns, thick neck with a great hump of muscle that erects in anger.

A really brave fighting bull is fearless. Spanish bulls have charged automobiles and even locomotive engines. The wild bull can outrun a horse for twenty five yards, turn with surprising agility, lift a horse and rider with his powerful neck muscles, toss them both over his head. In wild animal contests still occasionally staged, bulls frequently slay lions and tigers, charge even elephants.

The horns of a fighting bull can splinter and penetrate the inch thick planks of the bull ring barrier and even the iron stirrups of the picador, their effect in human flesh is similar to that of a bullet or other high speed projectile.

Despite the impressive power of the bull a bullfight is not regarded as an equal contest between man and beast, the fate of the bull is fairly certain. Rarely, when a bull is amazingly brave it will be granted a pardon and turned out to stud.

Hazards. Bulls killed forty-one out of 113 outstanding matadors in the past 250 years, many other lesser matadors have perished with several hundred aspirant matadors, or *novilleros*. Other participants also face perils. In the last one hundred years, bullfights cost the lives of fifty-seven picadors and 118 *banderilleros*.

Here is physician's son Hemingway's description of a mortal wound. "There was a horn wound in each thigh and in each wound the quadriceps and abductor muscles had been torn loose. But in the wound in the back the horn had driven clear through the pelvis and had torn the sciatic nerve and pulled it out by the root as a worm may be pulled out of the damp lawn by a robin."

A typical horn wound has an opening of less than an inch, often appears to be superficial. But when impaled on a horn, rotation of the matador's body can cause the horn tip to enlarge the internal wound in a cone-shaped area of laceration.

Marathon Swimming



Of all man's endurance feats, long-distance swimming seems to be, medically speaking, the most grueling. Tides, winds, waves, slapping sprays obstruct the swimmer, and the watery equivalent of a 16½-pound sandbag presses against his thorax. He must also brave nausea, vomiting, muscle cramps, numbing boredom, hallucinations, unconsciousness.

Yet long-distance swims across straits, rivers, lakes have attracted the stouthearted and stout since Captain Matthew Webb made the first successful English Channel attempt in 1875. His body greased outside with fish oil and warmed inside with brandy nips, he breast-stroked twenty-two or more treacherous miles in twenty-one hours, forty-five minutes.

First woman to swim the Channel was Gertrude Ederle; fastest woman was Florence Chadwick, also the first woman to go both ways. One of the fastest men (Frenchman George Michel, 11:05) forgot how to walk after landing, crawled on all fours in apparent locomotor confusion. A California sea lion swam the course in 5:04 with no confusion whatever.

Youth, sex are no barriers to mastery of the element that robs the body of heat twenty-seven times faster than air. Paced by a friendly shark, seventeen-year-old George Young swam twenty-one

miles from Catalina Island to Los Angeles, Marilyn Bell at sixteen conquered twenty-six miles of rolling jellyfish-infested ocean off Atlantic City, New Jersey, captured two other sensational records within the year.

Rewards for these lonely, often desperate exertions in darkness or scorching sun have been international celebrity, hopes of immortality, sizable cash awards. Some amateurs have done it for less.

Love and Legend. Mythical Leander swam the Dardanelles (Hellespont) nightly to visit his innamorata Hero, perished in a storm that obscured her beacon. Emulating the Greek youth's feat but not his fate, poet Byron in 1810 swam identical route from Sestos to Abydos.

Wrote he: "The immediate distance is not above a mile but the current renders it bazardous—so much so that I doubt whether Leander's conjugal affection must not have been a little chilled in his passage to Paradise."

Handicapped ashore by lame right foot, Byron was boastful of his swimming prowess. With a drinking companion he swam back and forth across the Thames without touching shore, another time crossed the Tagus River in Portugal in two hours, once was rescued by boatmen from drowning in the Brighton surf.

Artifacts hint that ancients used the dog-paddle, thus accounting for Caesar swimming off Alexandria with one arm while the other held aloft his copy of the famous Commentaries.

In Renaissance times a swimmer named Nicolas the Fish is said to have spent up to five days at a stretch cavorting dolphin-like in the Mediterranean, catching fish and eating them raw, occasionally carrying mail in a leather bag to Calabria as a favor to King Frederick III of Sicily. Legend had it that his fingers and toes were webbed, that "he could take in at one inspiration as much breath as would serve him for a whole day."

With the crawl, imported from the South Sea Islands via Australia and perfected in the United States, swimmers began increasing their speed and distances. Stroke efficiency, regularity of breathing, easier rhythm, and more relaxed body position appeared to be the new stroke's advantages. In comparative studies the crawl showed less pulse acceleration than the breast stroke, less blood pressure rise than the backstroke but somewhat more than the breast stroke.

Unforced breathing action is important to distance swimmers. Irregular forced respiration may imperfectly oxygenate blood, causing temporary muscular paralysis. Trained swimmers can pump 90 cubic inches per breath compared with an average 20 cubic inches.

Major muscles employed in the crawl stroke are the *latissimi dorsi*, the *gluteals*, the *quadriceps extensor*, *ilio psoas*, *gastrocnemius*, and the *biceps* and *triceps*.

Precise balance of muscle tension and relaxation is sought by expert swimmers, who know that tension raises the body's specific gravity while relaxation increases buoyancy. Paragon of smooth, apparently effortless crawl was Johnny Weismuller, famed Tarzan of the movies.

Well-padded musculature in distance swimmers is a vital defense against hypothermia. Experiments by a team of London physiologists revealed unusual tolerance in fat athletes for protracted immersion in cold water.

Tests with a stocky Channel swimmer revealed that crossing required a total energy expenditure of 9,000 to 15,000 calories, about 750 calories per hour (a marathon cyclist expends 600 calories per hour). Uncertain is whether distance swimmers maintain heat balance through high heat production, through the body's use of fat as fuel (switching over from glycogen to ketone bodies), or through ample tissue insulation.

Extra adipose tissue is undoubtedly valuable in prolonged cold water swimming. Measurements of sixteen Channel swimmers showed one-third fat compared with one-tenth in average adult males. Grease coating might add one to two mm. of insulation; one in the group used five pounds of grease, others none at all.

Temperatures at the finish ranged from 94.5° to 96° F. rectally

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and one normal oral temperature. Highest temperatures were the winner's and one female swimmer's. Both were fat even for inveterate Channelists.

Water Women. Female athletes have rarely distinguished themselves in endurance feats on land. Few have run the classic marathon or entered grueling long-distance bicycle races. But many women have accomplished long-distance swimming feats, often rivaling those of men.

Some attribute women's swimming success to the quantity and disposition of adipose tissue. Virtually all women endurance swimmers have been well flesbed, with ample secondary sex characteristics. Other qualities have been mentioned as part of women's equipment for marathon swimming: patience, courage, fortitude, stoicism, resolution to resist the frequently obsessive impulse to rest.

A study of forty-one Finnish women swimmers, not necessarily long distance, revealed no adverse effects on reproductive functions after strenuous activity.

Miracle Girl. A remarkable instance of female endurance swimming was sixteen-year-old Marilyn Bell's swim across Lake Ontario. She covered an estimated forty-two miles from Youngstown, New York, to Toronto (straight-line distance is thirty-two miles) in twenty hours, fifty-seven minutes, battling five-foot waves, leg numbness, stomach-ache, drowsiness, and cold water at 60° F. Her diet was corn syrup and pabulum; liniment revived her numb legs.

At swim's end her skin was a dull gray, lips blue and sagging, eyes glazed, but recovery was rapid in hospital. Unique for an endurance swimmer was her size: 5 feet 1 inch, moderately fleshed, slim rather than chunky.

Psychology. Disturbances of consciousness have occurred in some endurance swimmers. Hauled into his attending boat after seven hours in the water, the Egyptian Hamad asked for cotton to wipe his eyes, confusedly began eating it instead (thirty-five pounds heavier, he later won a Channel race). A Ladies' Race contestant complained of seeing animals in the water. Hallucinations during prolonged swims, periods of unconsciousness after

ward are not infrequent. Exhausted and aching, some have turned over in the water and cried or gone to sleep.

Swimming Health. Physical educators advocate swimming as best all-around exercise, developing supple muscles uniformly; they claim no excess weight is added after cessation of training as in other sports. Cautious professional swimmers plug their ears to avoid otitis, exostoses of the bony meatus, occupational diseases, which are a common result of prolonged immersion in cold water.

An early American swimming enthusiast wrote in 1818 that swimming "promotes cleanliness and consequently health, inasmuch as it encourages the practice of bathing by adding greatly to its pleasures."

Noted another enthusiast, Benjamin Franklin: "It is certain that much swimming is the means of stopping diarrhoea and even of producing constipation." The canny sage of Philadelphia also had a suggestion for conserving a swimmer's energy: float on your back, raise a kite, let the wind take you there.

Black and White War



No other game invented by man so completely absorbs his personality, conscious and subconscious, as the one where thirty-two figurines are manipulated on sixty-four black and white squares, intent on the death of a king

A Persian poet once wrote of chess "Know that its skill is science's self, the play distraction from distress . it counsels warriors in their art, when dangers threat and perils press, and yields us when we need them most, companions in our loneliness "

Contrariwise, Bernard Shaw has a character say that chess "is a foolish expedient for making idle people believe they are doing something very clever, when they are only wasting their time "

Between these two extremes, about eight million chess enthusiasts in this country (among them many physicians) find the game stimulating and challenging Of these, some ten thousand are members of about four hundred clubs affiliated with the United States Chess Federation Out of a population of 160 million, only about eighty persons are ranked as chess masters, participating in the 168 annual tournaments

The Game. Popular notion that chess originated in Persia is discounted by modern historians, who place the birth of the game's ancestor in India around the third century One hypothesis is that

violence-hating Buddhists encouraged the game as a substitute for war, arranging elephants, horses, chariots, and foot soldiers in four *angas* (army members), naming the game *chaturanga*.

From India the game evidently passed to Persia, where the name was corrupted to *shatranj*. When the Moslems conquered Persia in the seventh century, they probably acquired the game; an Arabic author wrote about it in A.D. 950.

Through the Arabs, the game apparently infiltrated into Europe, somewhere around the tenth century. The term *checkmate* (Ger. *schachmatt*) obviously comes from the Arabic *Shah mat*: the king is dead.

By 1061, a Christian bishop was reprimanded by his cardinal for indulging in "the vanity of chess," thereby defiling his hand "with the pollution of a sacrilegious game." Protestant Reformer John Huss in the fourteenth century deplored the game because it evoked violent passions.

Pieces. The king could formerly hop several squares, could also be captured without ending the game. The queen began life as a male counselor, could move only one square diagonally. The rook got its name from the Indian *ruk*, meaning a soldier. Knights appear always to have enjoyed their present erratic power.

Players. First important chess analyst was Spain's Ruy López de Segura (1561) in whose time castling was introduced.

In the eighteenth century appeared France's famous Philidor, followed by the English and German schools in the nineteenth century. One of the greatest masters of the last century was America's Paul Morphy (1837-84), who enjoyed a short but brilliant career.

Psychology. American poet Alfred Kreymborg once called chess "a war in the most mysterious jungles of the human soul." For psychoanalysts, chess is no mere intellectual struggle between strategists, but a violent and sometimes erotic conflict.

Basic psychoanalytic concept is that every male child goes through the Oedipus complex stage when he wishes to kill his father (unconsciously hated and feared) with the help of his mother, whose love he wants only for himself. The incestuous phase of the complex may be overcome in growing up, but the

unconscious retains elements that will respond to any symbolism that satisfies patricidal yearnings.

Chess supplies that symbolism. An opponent's king-father symbol must be destroyed with the help of the benevolent queen-mother. But a player's feelings toward his father are ambivalent: Thus his own king (loved) must be protected with the powerful help of the queen while the opponent's king (hated) must perish.

Granted this psychoanalytic hypothesis, women should make bad chess players because their unconscious drive (Electra complex) is love for the king-father and jealous hatred for the queen-mother. *Ergo*: women do not play championship chess because they are not impelled by any psychologic need to find a symbolic release for their dark motives. Fact is no woman has ever come near chess championship. Another explanation: female mind is intuitive, not mathematical.

Psychoanalyst Ernest Jones applied these concepts to the mysterious case of Paul Morphy, American chess master who attained international glory in the last century. At the height of his career, he suddenly gave up chess and tried to start a new life. He failed in law and love, became a paranoiac, finally died of apoplexy, aged forty-seven.

Dr. Jones's theory is that in every game Morphy played he wanted to destroy his father-image (psychoanalytically, to castrate him). As time went on, these continual "crimes" against the father-image obsessed him with subconscious guilt. Unable ever completely to defeat the paternal ghost, he was driven from the game.

Other psychoanalytic studies attribute phallic symbolism to the castle (originally an elephant), the bishop, and knight (horse-centaur). Crowning a pawn means converting weak little men into strong Amazon-like women with tremendous sex and war drive.

Psycho-strategy. Psychoanalysts divide chess players into two groups: the aggressive extroverts who play to win, using constant attack strategy, and the introverts who merely employ a static defense in order not to lose.

Some players are afraid to lose their queen because, unconsciously, they associate the piece with the mother they feared to lose in childhood. The opposite type play the queen recklessly, secure in their faith in maternal invincibility.

Outside the psychoanalytic field, it has long been recognized that a player's game reflects basic traits in his personality. The timid will cling to the king's pawn opening and rely heavily on a queen-bishop line of attack. The more venturesome ones will try unorthodox openings.

Some characters are brilliantly strategic in the middle game, others show their finesse in the end game. A timorous pessimist will concede a game that another will try to stalemate.

Known to all chess enthusiasts are the impetuous tactics of Morphy, the closed game of Steinitz, the unorthodoxy of Tartakower, the imaginative strategy of Alekhine, and the brilliant end games of Capablanca.

Whatever the deep impulses underlying a game of chess, few lovers of the game would disagree with British philosopher C.E.M. Joad: "Chess, like mathematics, deals with combinations and relations between things which are not material things, which belong to a different order of reality from the world we can see and touch. Chess is an art, chess is a study, chess is one of the noblest inventions of the human mind."

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VI

THE GREAT DOCTORS

The Endeavor of William Harvey (*Editorial*)



Greatness in medicine may be attained by discovering a drug or by formulating a principle. William Harvey attained greatness by formulating a principle that changed the face of Medicine. His scientific method replaced qualitative impression by quantitative mensuration. For introducing accurate calculation into medical research, Harvey deserves to be called the father of modern physiology.

Harvey's chief claim to fame rests not so much in his discovery of the circulation of the blood, which had already been described by Colombo and Cesalpino, as in his having *demonstrated* it scientifically. Harvey's historical hour was not in 1628 when he published a little book that revolutionized medicine, but in 1616 when he enunciated, before an audience that failed to understand him, the principles of the circulation of the blood. With admirable scientific honesty, Harvey did not publish his findings until twelve years later, after he had verified them conclusively.

The secret of Harvey's achievement can be traced back to his youthful years in the sun-drenched Italian town that Shakespeare called "Fair Padua, nursery of all arts." There Harvey, already enriched by the anatomical heritage left by Vesalius, watched the great Fabricius dissect the venous valves in his famous anatomical theatre, a dark cavernous wooden box lit only by flickering candles held aloft by the students. There also, many a night, he watched

through Galileo's telescope the glittering stars in the Paduan sky, learning from the master the laws that regulate the motion of the celestial bodies, laws that he would later apply to the motion of the blood.

Harvey was a man of the baroque, the seventeenth-century art style characterized by excessive ornamentation, emotion, and movement that wrenched the stone of cathedrals from its Gothic placidity and rendered it in dizzying whirlpools. *Movement* in the baroque was expressed with the curved line and the circle. Is it surprising then that Harvey, who lived in and breathed this dynamic atmosphere, transplanted to science the concept of the circle and the dynamics of motion? That is how Harvey became interested in the two movements in man that last from birth until death: respiration and the heartbeat.

All of man, body and mind, abhors a vacuum. Just as the body must fill with fat and connective tissue the void created by the extirpation of an organ, so must the mind replace one belief by another if it is to avoid a crisis. The Renaissance uprooted man's medieval convictions, thrusting him into a crisis when new convictions were not promptly forthcoming. Harvey lived through this crisis, and he did what every human being in a crisis does: he "undressed." A man in a crisis sheds everything, hat and coat, that may hinder action. Harvey shed the old Galenic ideas and tried to solve the ideologic crisis of his time by developing new scientific convictions.

Harvey lived in two countries that were ideal ground for his endeavors. In every historical period there are "visceral" countries, that is, countries that become the vital organs around which the rest of the world is organized. In Harvey's time the visceral countries were Italy, where he spent his youthful years, and England, where he lived his years of assertion and maturity.

In the beginning perhaps Harvey, like most young men, sought glory merely by emulating someone great—Vesalius or Fabricius; but later the way to glory lay in creating an "open"—baroque—vision of the human body instead of the "closed" architectonic—Renaissance—vision of Vesalius. Harvey's physiologic work was pure baroque action, *anatomia animata*, that is, moving anatomy in space, just as his embryologic work was moving anatomy

in time. Without an understanding of this haroque influence upon Harvey, one cannot fully understand the historical meaning of his endeavor.

There is still much to be studied about Harvey. His little-known years of research in London, prior to his discovery, were the same years in which Shakespeare presented his plays at the Glohe Theatre. No other plays mention the words "heart" and "blood" as often as Shakespeare's do. In *Hamlet*, *Macbeth*, *Coriolanus*, the poet's intuition seemingly anticipated the scientist's concept of the motion of the blood. Shakespeare's work is as Aristotelian in its concept of the heart as the source of life and of the emotions as was Harvey's in the scientific world. One can well imagine the impact of the bard's verses upon the mind of Harvey.

William Harvey will always be one of the greatest examples of the scientist who lives to seek the truth in science. He was a simple man who crossed the threshold to greatness on that memorable day in April, 1616, when he wrote in his notes for the second Lumleian Lecture that the blood circulates and that it does so in a *circle*.

William Harvey



Clay lies still, but blood's a rover.

—A. E. Housman: *The Shropshire Lad*

In the gloomy wood and stone anatomical theatre, the candlelight glinted on the scalpel as three hundred pairs of eyes watched the blade dissect the corpse's cranial nerves. The air reeked of sweat, leather, and putrefying flesh. High up on the gradients, jostled on all sides, stood a slight figure in doublet and hose, a twenty-year-old student come to Padua to learn anatomy and surgery. His name, William Harvey.

When he had arrived in Padua in 1598 the town was at its height of cultural glory. Medical teaching had bloomed in 1250 with Pietro D'Abano, had reached its peak with Vesalius in the middle of the sixteenth century.

The academic atmosphere into which Harvey plunged was a ferment of new ideas, the *nova scienza*. The drawings of Leonardo da Vinci, Titian, and Michelangelo had awakened an interest in anatomy, Andreas Vesalius had shattered centuries of Galenic tradition with his *Fabrica*, probably the stormiest book in the history of medicine. The struggle between the moribund Scholasticism of the Middle Ages and the bursting curiosity of the Renaissance was fought in disputations often ending in bloody brawls.

Padua's Influence. Fabricius d'Aquapendente (1533-1619), under whom Harvey studied, was famous as a surgeon, anatomist, and embryologist, the first to dissect and accurately describe the venous valves. His best work was on the physiology of the fetus and on childbirth. From him Harvey derived his abiding interest in embryology.

Fabricius was unconscionably slow and meticulous in dissection, often derided by his students, but doubtless he inculcated in the English pupil the habit of careful and patient work with blade and forceps.

As important as anatomy studies were Harvey's talks in Padua with Galileo (1564-1642), master of physics and astronomy, inventor of the telescope. From him he learned the basis of the experimental method: the need to examine facts in the light of criticism, then reproduce phenomena experimentally to verify observed facts.

From Galileo also, Harvey learned about the orbital motion of the heavenly bodies, imbibing the concept that nature must be studied in relation to movement.

The Life. Little of this intellectual richness was foreshadowed on April 1, 1578, in the twenty-first year of the reign of Queen Elizabeth, when there was born the first of six sons to one Thomas Harvey, Esq., a prosperous alderman, and to his wife Joanne, living in a house of "fair stone" in the small Channel port of Folkestone.

England was then hot in the struggle to assert her independence in religion and politics, eager to grasp her share of the new mercantile wealth. Francis Drake was sailing around the world, plundering Spanish ships by the way, laying the seeds of the war that flared ten years later.

During his summer holiday from Canterbury Grammar School, ten-year-old Will Harvey watched part of Spain's Invincible Armada cruising off Folkestone, harried by nimble English ships. By the time he returned to school, church bells were pealing out the defeat of the invincible. As a "jurat" of the Cinque Ports, his father doubtless helped outfit some of the victorious English ships.

From grammar school, Harvey was in 1593 admitted to Caius College at Cambridge as a "lesser pensioner at the scholars' table."

He spent about five years there 'in preparation for a learned profession," left it with the degree of Bachelor of Arts, and embarked for Padua.

After obtaining his M D from Padua in 1602, Harvey became a physician at St Bartholomew's Hospital in London, later became Lumleian lecturer at the College of Physicians. The post earned an annuity of forty pounds, required two lectures a week, in which forty five minutes were in Latin and fifteen in English. Harvey held the post from 1615 to 1656, then donated fifty-six pounds per annum to the College of Physic for an annual lecture, today known as the Harveian Lecture.

He became physician extraordinary to the weak legged, slovenly successor to Elizabeth, James I, in 1618, also rendered medical service to the young Prince, later to become the ill fated Charles I. In between (c 1604) he had married twenty four year-old Elizabeth, daughter of Dr Launcelot Browne, physician to the Queen and later to James I. Nothing more is known of her than that she was fond of a parrot, reputed to be a male 'handsome' and a famous talker. But the feathered gentleman was a lady, as Dr Harvey established when he performed an autopsy on the bird and discovered an addled egg in its oviduct.

During the civil war, Harvey sided with the King's party, for which a London mob plundered his Whitehall lodgings, stealing or destroying his priceless observations on the dissection of animals. Lamented he that 'for love or money I could never retrieve or obtain them."

When Charles I went to the scaffold in 1649, Harvey withdrew almost completely from the world. He died in his rich merchant brother Eliab's house on June 3, 1657, in his eightieth year. His body was encased in lead and laid in a private chapel in the Essex village of Hempstead, later moved in 1883 to a tomb in Hempstead Church. From his will "Touching my books and bousehold stuff, pictures and apparell of which I have not already disposed I give to the Colledge of Physicians my best Persia long Carpet and my blue sattin Cushion one paire of brasse Andirons with fireshovell and tongues for the ornament of the meeting roome I have erected for that purpose."

The Man. Harvey was short and spare, with long thin fingers,

olive complexion, small flashing black eyes, and raven black hair until about twenty years before he died, when it became quite white. His habitual dress is described as "rich but not gaudy"; after his friend and master was beheaded he took to wearing somber colors and never more used lace or embroidery.

Contemporary reports on his personality are not clear. The usually unreliable English antiquarian John Aubrey says William and his five brothers were all very "choleric." Other descriptions of him are: candid, cheerful, upright, unostentatious, open-handed, and indifferent to wealth.

He appears to have had no violent feelings of rivalry or hostility, proved by the mild way in which he treated the vicious attacks made on him by opponents of the circulation theory. He lived all his life on happy terms with his brothers and friends. One curious personality trait was his love of dark places, as when he spent days meditating in caves dug out of the hillside of his Surrey estate. This may have been a psychologic throwback to the hours spent in Fabricius' cavern-like anatomy theatre.

When he retired into loneliness, he wrote to his lifelong friend Dr. George Ent: "this life of obscurity, this vacation from public business, which causes tedium and disgust to so many, has proved a sovereign remedy to me." Yet he by no means became a misanthrope.

Eccentricities reported by his great-niece: he used to walk through fields, energetically combing his hair; he would sit down to dinner at the exact appointed time, whether guests had arrived or not; his salt cellar was always filled with sugar, which he used instead of salt. A habitual gesture was to toy with a dagger at his belt.

The Work. As a general practitioner, Dr. Harvey was no great success. Though he counted several eminent men among his patients, including the hypochondriac Lord Chancellor Francis Bacon, he had little patience with the ailments of mankind. The unreliable Aubrey reports him as having once cynically remarked that "Man is nothing more than a great mischievous baboon."

Although an excellent anatomist with cadavers, Aubrey claims that he never heard anyone admire Harvey's "therapeutique way"

and that other practitioners would not pay threepence for a Harveian "hill" or prescription.

His main interest was in unusual medical cases. When King Charles heard of a young nobleman with a hole in his side, he sent Harvey to investigate. Wrote the "little doctor": "I found a large open space in his chest into which I could readily introduce three of my fingers and my thumb. . . ." Inside was a mass of tissue that alternately swelled and shrank under the touch. He noted that the heart was "retracted and withdrawn" in diastole, but "emerged and protruded" in systole. Also noticed was a relation between the heartbeat and the phenomenal young gentleman's pulse.

A case of prolonged generalized analgesia in an eighteen-year-old girl was reported by Robert Boyle (he of the gaseous law): "This Maid having remained a great while in the Hospital without being cured, Dr. Harvey, out of Curiosity, visited her sometimes; and suspecting her strange Distemper to be chiefly Uterine, and curable onely by Hymeneal Exercises [charming euphemism], he advised her Parents . . . to take her home, and provide her a Husband, by whom, in effect, she was according to his Prognostick, and to many Mens wonder, cur'd of that strange Disease."

Such cases stimulated Harvey's interest in the relation between psychic states and somatic ills, a foretaste of present-day psychosomatic medicine. Wrote he: "Every affection of the mind that is attended with either pain or pleasure, hope or fear, is the cause of an agitation whose influence extends to the heart." And again, there are some "who are deranged in mind, or who are agitated to such a degree by a violent passion that they feel no pain, and pay no regard to the impressions made on their senses."

As for Harveian therapy, the only surviving letter from his professional correspondence contains directions for treating a lady "affected with a cholic passion of a hot and bilious nature" by bleeding and purging.

More interesting to Harvey than all the colicky patients were chick embryos and animal hearts. Charles I gave his physician permission to anatomize deer in the royal park, himself attended the dissections. Eggs with two shells, eggs at various stages of incubation, beating animal hearts; the little doctor shared his interests with the little King. Whatever judgment history has passed

on Charles I's double-dealing and pigheadedness, he was a great boon to Harvey's experimental method and the best patron he could have.

Overshadowed by the circulation discovery is Harvey's work in embryology. He advanced that science as far as anyone could go without a microscope. His *Exercitationes de generatione animalium* (1651) might never have been published if Dr. George Ent had not virtually torn the manuscript from his hands. Established by Harvey as a biologic axiom that has stood up to time: all living beings develop from an egg, *omne vivum ex ovo*. The spermatozoon was not discovered by Ham until twenty years after Harvey's death.

The Discovery. What astonishes the twentieth-century reader of Harvey's *Exercitatio anatomica de motu cordis et sanguinis in animalibus* (1628) is the simplicity of his epoch-making experiments. In one such, he simply applied a bandage on the arm as for bloodletting, then noted that arteries were distended above but not below it; veins below the bandage were distended but not above it. Other experiments included cutting or ligating vessels, opening a beating heart.

The historic passage in Harvey's book reads: "And now I may be allowed to give in brief my view of the circulation of the blood, and to propose it for general adoption. Since all things, both argument and ocular demonstration, show that the blood passes through the lungs and heart by the action of the ventricles, and is sent for distribution to all parts of the body, where it makes its way into the veins and pores of the flesh, and then flows by the veins from the circumference on every side to the centre, from the lesser to the greater veins, and is by them finally discharged into the vena cava and right auricle of the heart, and this in such quantity or in such a flux and reflux thither by the arteries, hither by the veins, as cannot possibly be supplied by the ingesta, and is much greater than can be required for mere purposes of nutrition, it is absolutely necessary to conclude that the blood in the animal body is impelled in a circle, and is in a state of ceaseless motion; that this is the act or function which the heart performs by means of its pulse; and that it is the sole and only end of the motion and contraction of the heart."

The second astonishment today is that Harvey was lecturing on

the circulation of the blood at the College of Physicians as early as 1616, whereas his epoch-making book was not printed in Frankfurt until twelve years later. His detractors claim this as proof that Harvey himself did not feel that he had discovered anything startling. Counterargument is that he waited until many more experiments had confirmed his original findings before going into print.

Pre-Harvey. The discovery was made against a background of centuries-old anatomic confusion. It was known before Harvey that the blood moved, but allegedly with a tidal ebb and flow. The heart was considered more like a suction pump that drew blood as it dilated, i.e., diastole was the important movement, not systole.

The liver produced blood and circulated it. Or there were two kinds of blood: the dark hepatic variety carrying nourishment and the brighter red fluid coming from the heart and supplying heat. Or the blood conveyed three kinds of spirit: natural, animal, vital. Harvey himself thought that blood was "strained" in passing through the lungs.

Leading precursors of Harvey were Spain's Michael Servetus (1511-53), Italy's Realdo Colombo (1510-?) and Andrea Cesalpino (1519-1603). The three helped to undermine Galenic teaching.

The Controversy. Many of Harvey's medical contemporaries refused to accept his simple explanations of blood circulation, mocking him as the "Circulator." Noted also by the acidulous Aubrey: "Twas believed by the vulgar that he was crackbrained and he fell mightily in his practice."

Leading opponents were the Scotsman James Primrose and the two French physicians Jean Riolan and Guy Patin, the noisy Dean of the Faculty of Paris. Ardent Galenists, they upheld that if anatomic observation no longer agreed with Galen, it could only mean that nature had changed since Galen's time in the first century. Dean Patin used more vituperation than logic, declaring that Harvey's theory was "paradoxical, senseless, false, impossible, absurd, and harmful."

Harvey's supporters came from England, Denmark, Germany, Holland. Among them were men who left a mark on medical history: Denmark's Niels Stensen, who discovered the parotid and

lachrymal ducts; Thomas Bartholin, describer of the lymphatic system (his son Caspar put his name to the vestibular glands); René Descartes who accepted Harvey's principles in his famous *Discours sur la Méthode*, bible of the rational approach to knowledge.

Harvey took practically no part in the raging controversy. His opponents and supporters vilified one another in print and on podium, but the only opponent whom Harvey dignified with printed replies was Jean Riolan, his fellow student at Padua. Compared with the vituperation of the time, his prose is singularly mild.

A contemporary tribute to Harvey, four years before his death, was this couplet of Dr. Martin Lluelyn:

*There didst thou trace the Blood, and first behold
What Dreames mistaken Sages coined of old.*

The Aftermath. From Harvey's momentous work to the present there stretch three centuries of ceaseless discoveries about the heart and the circulatory system. Wrote Jean Riolan in Harvey's time: "Everybody is discovering something new nowadays."

What is now known about the movement of blood in the body is that the pumping action of the heart establishes a fluid pressure gradient by reducing pressure in the veins and increasing it in the arteries.

Established after countless animal experiments is that the flow of blood is so regulated that the composition and temperature of the extracellular fluid remain fairly constant despite wide variations in the metabolic levels of organs and tissues.

Further established: the chemical, nervous, and hormonal mechanisms that regulate blood flow through the skin; the nervous and chemical control of blood flow through the kidney; intrahepatic vasomotor changes regulating circulation through the liver; circulatory mechanisms in muscle; modifications in the uterine blood flow during the oestrus cycle; blood circulation through the spleen; extrinsic and intrinsic control of cerebral circulation.

Cardiac Surgery. Most remarkable development in the last five years is the use of heart-lung machines for collateral circulation during heart surgery. Basic principle: venous blood is channeled into an oxygen-containing vessel, then pumped back into an artery. Plastic oxygenators can be made for a few dollars by almost any-

one. Such machines can bypass the human heart for about an hour.

Manual massage of an arrested heart has become almost a common procedure, saving numerous lives. Plastic-tube arterial grafts are two-a-penny. Closed valves are opened up, defective ones repaired. Collateral coronary circulation is on the way to becoming an established procedure.

The most recent advance, which must rejoice the shade of William Harvey, is the technique of mapping the heart through a catheter inserted in a vein. Using minute sound detectors, clinicians can now detect most heart abnormalities.

An echo of Harvey's earlier observations is the fairly well-established relationship between psychic stress and cardiovascular dysfunctions, notably hypertension. Most recent theory in this field is that prolonged hypertension can actually "condition" the heart muscle into reflex tachycardiac responses, accepting high blood pressure as normal.

Still unresolved three hundred years after Harvey is the problem of clogged arteries. Does atherosclerosis proceed from a high-fat diet or from the ingestion of certain types of fat only? Are lipids the only culprits in narrowing the arterial lumen?

Almost for centuries after his death the scientific quest of William Harvey still goes on.

Flashback on Genius



*The childhood shows the man
As morning shows the day.*

—Paradise Regained

If John Milton was right, five famous Nobel prize winners in medicine and physiology—Ross, Pavlov, Fleming, Waksman, and Ramón y Cajal, respectively—should have been poet, priest, farmer, schoolteacher, delinquent. History made other choices.

In world's eyes, Nobel laureates are supermen endowed with genius. In modern history of medicine, while most prizewinners had a touch of genius, not all geniuses received the Nobel prize. Prime difficulty consists in defining genius. The generally held notion is that it is composed of intuition, aptitude, and untiring effort, that it requires the "right" place and historical time to blossom.

But as lives of Nobel laureates show, chief weakness of Nobel prize in medicine is that it concentrates attention on one discovery, obscuring a long chain of experiences foreshadowing the Stockholm accolade. Fleming's discovery of penicillin, Freud's foundation of psychoanalysis, Cajal's neuron doctrine were all preceded by years of scientific discoveries and philosophic work. The solemn ceremonial at the Nobel prize awards is but a moment in the procession of medical history.

For doting parents convinced that they have a budding genius

in their midst, it has been demonstrated that there is no favorite ground for birth of future laureates in medicine and physiology. Though Asia and Middle East are barren, other regions are well represented, with the United States gradually narrowing down Europe's lead. Parentage of laureates runs gamut from peasantry to aristocracy, with strong preference for middle-class professional fathers. Study of laureate biographies reveals an interesting fact: future Nobelists are usually sedentary workers, often being born, working, and dying within a small area. Geographic vitagraph of their lives would show generally even pulsations, with trip to Stockholm as sudden peak deviation. "Great geniuses," said Ralph Waldo Emerson, "have the shortest biographies."

In the youthful biographies of Nobel prize winners below, the truth must be told: not one showed early signs of intuitional flashes, nor the inner voice of mystic dedication warning that the moving finger of destiny would point to them. Yet for all their ingenuous youth, the germ of genius was snugly planted.

HEINRICH HERMANN ROBERT KOCH (1834-1910)

Born in the Harz mountain village of Clausthal, his earliest memories were of the huge, gloomy forests of pine and fir, a two-storied wooden house with a slate roof, busky mountaineers tracing their ancestry back to the pagan Franks. Memories also of his brawny wide-shouldered father, mountaineer at first, then a local *Bergamt* official, and of his small, plump, mild-mannered mother. From the father he derived a love of nature and an insatiable *Wanderlust*, from *Mutterli*, an inexhaustible good nature and untiring diligence.

At age seven, the future Nobelist entered primary school, became a good, if not a model, *Schuler*. In his spare time, Robert roamed with schoolmates through the forests, collecting insects, plants, strange-shaped stones. At home he examined ferns and mosses under a magnifying glass, went on to dissect animals and string their skeletons. His final high school report read: "Behavior—good; attendance—generally regular; application—satisfactory; Latin, Greek, Hebrew, French—satisfactory; English, German, mathematics, natural science, physics—very good."

The *Herr Direktor* reported that young Koch evinced a burning desire to study philology, but it respectfully seemed to him (the *Direktor*) that young Koch was better suited to a career in mathematics, the natural sciences, possibly medicine. After flirting with idea of becoming a traveling salesman, Koch entered the University of Göttingen in 1862, chose not philology but mathematics and natural sciences; after two semesters, changed over to medicine. Both Papa and Mama Koch lived to see their handsome, bespectacled son become a physician, but they were both dead when, aged thirty-nine, he announced to the Berlin Physiological Society that he had discovered the bacillus of tuberculosis. At age sixty-two, he was presented to royalty to receive the Nobel prize "for his investigations and discoveries in regard to tuberculosis." And his lifelong *Wanderlust* was satisfied by travel in Italy, Egypt, India, Java, Africa—not as a salesman but as a world-renowned epidemiologist.

ILYA ILYICH MECHNIKOV (1845-1916)

In a country manor house in the province of Kharkov (Ukraine) was born the fifth child of an officer of a crack Imperial Guards regiment. Attached to the manor house was the feudal village of Ivanovka, its serf inhabitants belonging body and soul to the Mechnikov family.

Mechnikov *père* must have found life in the country monstrously dull, spent much of his time with his regiment in gay St. Petersburg. The children's upbringing was left to Mme. Mechnikov, aided by a succession of private tutors, mostly poor university students trying to earn the price of books. From his peasant *nyanya*, child Ilya heard wondrous tales about his own namesake, Ilya Murometz, mythical giant of Russian folklore; from the usually wan, moody tutors, he received a smattering of elementary learning. Aged eleven, he was finally sent to the *lycée* (secondary school) in the town of Kharkov. Mama probably felt relieved. Through childhood, Ilya was sensitive and brooding, nicknamed "quicksilver" by siblings, described by mother as "neurotic," a word meaning moody or "difficult" in the mid-nineteenth century. Reigning passions: music and nature lore.

At the University of Kharkov, young Mechnikov rubbed elbows with fiery revolutionaries. Karl Marx's *Communist Manifesto* had appeared only some twelve years before, smuggled copies being circulated among Russian students. The opportunity for sedition was there, with Siberia at road's end. But student Ilya Ilyich was too busy peering through the school's ramshackle microscopes to notice the Socialist hubbub. At age sixteen, he wrote a critical analysis of a Kharkov professor's textbook on geology, which was published in the *Journal de Moscou*. Finding the provincial university dreadfully limited, he crammed and finished the course in two years instead of four. When he began to teach at the University of Odessa he was only twenty-two, many of the third-year students were older than their professor. He was sixty-three years old when he shared with Paul Ehrlich the Nobel prize in recognition of their work on immunity. When he died in 1916, the ancient feudal Russia of his childhood was barely a year away from the reign of Lenin and Stalin.

IVAN PETROVICH PAVLOV (1849-1936)

No manorial festivities marked the earthly arrival of Ivan Petrovich, born in a village in provincial Ryazan, just five years after contemporary landowner Mechnikov. His father, a peasant turned priest, eked out a bare living for the family of five children (six others died of infectious diseases). Although no longer a serf, a village Orthodox Russian *pop* in those days lived in a log cabin like other peasants, subsisted chiefly on presents of food from parishioners, in return for baptism, marriage, and burial services.

Despite his dilapidated *isba* and shabby cassock, Father Pavlov was a strong-willed man with a passion for learning. He taught children to read, whipped them with birch rods when attention lagged. At age nine, the future Nobelist fell off a wall onto a stone floor, was laid up for a long time, probably as a sequel to concussion. He was already eleven when his father entered him in a theological seminary, determined to make at least one son a good priest. Ivan was willing, he loved to dispute obscure points of neo-Byzantine theology with fellow seminarists. Unfortunately for

theology, his attention was distracted by biology. At age twenty-one, he put off his homespun seminarist gown, enrolled as a poor student at St. Petersburg University. He was graduated from the Medico-Chirurgical Academy in 1879. In his fifty-sixth year, he received the Nobel prize "in recognition of his work on the physiology of digestion, by which, in essential respects, he has transformed and enlarged our knowledge of this subject." He died in 1936 at the venerable age of eighty-seven, when the placid Russia of his childhood was moiling in the throes of a Five-Year-Plan, and the priest that he might have become was derided by the state-sponsored Anti-Religion League, while the scientist was honored by the state.

SANTIAGO RAMON Y CAJAL, (1852-1934)

To the families of respectable children he was a terror, to his own family a source of puzzled heartache. Born in the ancient mountain village of Petilla de Aragon in the Spanish Pyrenees, the youthful Santiago qualified for honors in juvenile delinquency. He admitted autobiographically that he was a restless, mischievous problem child. In the village's memory this was a masterly understatement.

Elected leader of a boy's gang, the brilliant neurologist-to-be frayed local nerves by organizing raids on orchards, pilfering, springing practical (often painful) jokes on harassed citizens. Fathers of law-abiding families drew up an awesome *Index of Bad Companions*, put thin-faced Santiago high on the list. His father, working desperately to become a qualified surgeon and physician, unrelentingly whipped the boy's buttocks, already sore from school birchings, sent him to bed without supper. Santiago's marauders continued their forays, finally landing their leader in jail for three days at the age of eleven.

At the parochial school the outmoded rigid system of teaching chafed his nerves to the raw. Latin by rote was an incitement to hyperkinesis. While schoolmates parsed, Santiago filled margins of books with deft sketches. When he announced his intentions of becoming an artist, father promptly took him out of school (aged fourteen) and apprenticed him to a barber, later to a shoemaker.

Drawing or painting was ferociously *prohibido*, forcing the frustrated Goya to sketch in secret.

Shoemaking apparently rearranged Santiago's neuronal patterns. When allowed to resume studies he was a changed boy, earnestly sticking to his intellectual last. Convinced by now that he had an unusual son on his hands, his father gave him premedical lessons at home, was startled to see brilliant drawings of bones and muscles. The family having moved from their wild mountain fastness to the thriving city of Saragossa, Santiago galloped through medical school and graduated at twenty-one, became a professor of anatomy four years later. When he was fifty-four, he shared with Italy's Camillo Golgi the Nobel prize "in recognition of their work on the structure of the nervous system." For any survivors of the nerve-racked Aragonian villagers, this was pleasant irony indeed.

PAUL EHRLICH (1854-1915)

On a beautiful day in March, the prosperous landlord of the *Krug zum Rautenkranz* (Tavern of the Wreath of Rue), in the Silesian town of Strehlen, was gratified to welcome a son after a succession of girls. In the boy's recollection, Papa Ehrlich was a good-humored man with weird habits. He would sit at the window for hours talking to himself, jerking his head, and waving his hands. When he told a joke he repeated it over and over, laughed loudly each time. Linchpin of the family and tavern was Mama Ehrlich, a square-faced, cheerful woman who brooked no nonsense. From his father, the future Nobelist copied the curiously jerky speech and agitated hand movements that remained a lifelong idiosyncrasy.

Schoolboy Paul studied hard, got in no scrapes. Aged eight, he concocted his own prescription for cough drops and had them made up by the local pharmacist. His idol was cousin Karl Weigert, later the eminent pathologist, nine years older. Paul led a troupe of boys as "brigands" in the stony hills around Strehlen, mild boyish games totally unlike the vandalism being practiced by contemporary Ramón y Cajal demons to the south.

High school reports show young Ehrlich's toughest stumbling block was German composition. Forced to write, he would bite

the penholder, scratch behind his ear, alternately ruffle and smooth his blond hair, finally produce involved sentences that plunged teachers into despair.

At his two universities, Breslau for science and Strasbourg for medicine, he drove everyone frantic by constant experiments with aniline dyes, then the fashion in German chemistry. At Breslau, a visiting physician was shown over a laboratory, came to Paul's dye-stained corner. Scoffed the accompanying professor, "That is little Ehrlich. He is very good at staining, but he will *never* pass his examinations." The visitor was Robert Koch, later a lifelong friend of the shy dye-stained student.

Ehrlich was fifty-four when he shared the Nobel prize with Mechnikov "in recognition of his work on immunity." During Ehrlich's high school days, Bismarck humiliated France in the 1870 war; when Ehrlich died in 1915, Kaiser Wilhelm's troops were within shelling distance of Paris. From German war fever there was no immunity.

RONALD ROSS (1857-1932)

A few days after Major (later General) Campbell Claye Ross welcomed his first son, Ronald, he was called to horse to take the field against rebels in the Indian Mutiny. In the spacious hill-country bungalow in northwest Nepal, under the towering snow-capped Himalayan range, the baby was tended by his mother and an Indian amah. His first gurgled words were in Hindustani and in English.

Even in the foothills the heat was intense, myriad flies and mosquitoes swarming up from the low-lying *tarai* swampland. For the future winner of a Nobel prize on the habits of *Anopheles* et al, there was no lack of empiric observation. His father was no typical Colonel Blump, liked to paint water colors and compose music, to which the youthful Ronald set his own piano accompaniments.

At age eight, he was sent to England to live with relatives and attend a typically dull preparatory school. He took refuge in reading, soaking up reams of the Bible, Shakespeare, and other Eliz-

abethan authors. Exclaimed his uncle one day, "Why, the boy talks Elizabethan English." Main interests were reading, music, mathematics, a zoological encyclopedia, and a family of pets. In adolescence he was dubbed a "dreamer," wrote on romantic themes, and composed lyrical poems.

Young Ronald showed no inclination to medicine, in due course complied with father's wish to see him in the Indian Medical Service. In 1874 he was a medical student in St. Bartholomew's Hospital, spent many hours writing verse, composing music, modeling in clay. He admitted candidly that he wanted to "seek every possible experience and try my hand at every possible art." While serving as an ill-paid ship's surgeon on the transatlantic *S.S. Albatross*, he wrote a novel about shipboard life. Arthur Conan Doyle (1857-1932) also served aboard ship as a surgeon, lived almost the same span of life as Ross, whose friend he became in adult

VII

MEDICINE AND SCIENCE

Old Age and Medicine



*There is beauty in extreme old age—
Do you fancy you are elderly enough?*

—W. S. Gilbert

Medicine's rapid strides during recent decades have created a seeming paradox: the greater the progress at one end of the life spectrum, the more pressing the problems at the other end.

In 1900, there were three million Americans over the age of sixty-five, or 4 per cent of the population; today oldsters are crowding the fifteen million mark, representing about 9 per cent of the total. By 1975, statisticians expect twenty-five million over-65's, roughly 13 per cent of the population.

Two important causes of the increase in senior United States citizens lie in the prevention and control of infectious diseases and the dwindling birth and immigration rates. The birth rate, which was 30 per 1,000 in 1900, sagged to 18 in 1933, rose to 25 per 1,000 with the postwar boom in babies.

The medical profession's answer to the challenge is in the growth of geriatrics as a specialty; just as pediatricians a half century ago realized that children could not be treated as small adults, physicians now agree that persons over sixty-five cannot be treated merely as older adults.

Age in the Ages. Modern geriatrics could not have been born

until man's attitude toward old age had passed through various stages of indifference, veneration, derision.

Early Lahrador Indians left old people to freeze in the snow; among Gran Chaco Indians in former times a son discharged his filial duty to aged parents by leading them into the forest, dispatching them with a few humane blows. The ancient Greeks and Romans paid lip service to their elders, but revered youth; a popular Roman adage: "old age itself is a disease." Medieval art and literature bitterly lampooned all aspects of age; hatred of the elderly probably heightened the ferocity of sixteenth and seventeenth-century witch hunting. Conversely, ancient Egyptians showed profound respect for the aged, while reverence for elders was a part of Chinese culture for thousands of years.

Age and Medicine. Objective views of age go back as far as Hippocrates (460-370 B.C.), who listed senile diseases and their treatment, but the first thoroughgoing study was a work by French physician André du Laurens, of Laurentius (c. 1558-1609), published in 1597 and translated into English as *Discourse of the Preservation of the Sight; of Melancholike Diseases; of Rheumes, and of Old Age*.

William Harvey's (1578-1657) famous autopsy of Thomas Parr and his posthumous *Anatomia Thomae Parri*, which focused attention on the pathologic anatomy of age, ranks among the forerunners of geriatrics; so does Sir John Floyer's (1649-1734) *Medicina Geronomica, or the Galenic Art of Preserving Old Men's Healths* (1724), first systematic treatise on the diseases

to old age: "to restore . . . a diseased organ or tissue to a state normal in senility; not to a state normal in maturity."

The new discipline sprouted slowly, but flourished during the last decade: 1945 saw the founding of the Gerontological Society and its publication, *The Journal of the Gerontological Society* ("To add life to years, not just years to life"), and the inauguration of the journal *Geriatrics*. More recent additions include: the American Geriatric Society, publisher of the *Journal of the American Geriatric Society* (inaugurated 1953); the *Journal of Chronic Diseases* (dating from 1955); the American Medical Association's Committee on Aging under its Council on Medical Service.

Physiology of Aging. The most conspicuous evidence of aging in tissues is a decreased amount of parenchyma and a relative increase in stroma. Aged parenchymal cells often appear abnormal and meta- or anaplastic. Each organ has its own pattern of aging, both morphologic and physiologic. Atrophy of the ovary may be so complete that only a small piece of inactive fibrous tissue remains; such ovarian atrophy begins early in life, compared with atrophy of the testis.

The aged thyroid loses follicles and many of the remaining ones are empty, or contain poorly staining colloid. In the pituitary, pancreas, and adrenal, morphologic changes are more subtle, but there is usually some change in function. The liver shrinks in size and the stomach gradually secretes less and less hydrochloric acid. In the kidney, whole nephron units disappear, and many of those that remain appear to be damaged. The heart becomes larger and heavier, apparently to compensate for the harder job of pushing blood through narrower vessels. Fat and fibrous tissues accumulate. The regulation of the heart beat is less efficient, with premature contractions and auricular fibrillations. The voltage of the cardiac impulses drops. Throughout the body, arteries and arterioles lose their elasticity and resilience, show atheromatous and sclerotic damage; as a result, the arterial pulse wave is propagated more rapidly, and blood pressure increases. In the nervous system, whole neurons disappear and nervous responses are slowed. Skeletal muscle shrinks in size and decreases in responsiveness. Bones become brittle. The skin gets darker, dehydrated, thinner, loses its regenerative power. In contrast to these various age changes in

most of the organs and tissues, the blood remains practically unaltered.

Hormones. Today's pressing problem in gerontology is to discover which physiologic changes are the result of aging, which are its cause. Failure of the cardiovascular system is often blamed for the whole constellation of effects called aging. Inefficient circulation slows the normal functioning of the cells and promotes atrophy.

Other possible culprits have been sought in the endocrine system. The most recent investigations show hormones to be active in an amazing variety of chemical reactions in the body. Sex hormones are directly concerned in all protein synthesis and degradation. Estrogen increases the clotting power of blood; it is also involved in fat metabolism and may be important in controlling atherosclerosis and other circulatory diseases.

Some researchers view the decline of sex hormone production as one of the principal causes of senility. Others attribute aging to the failure of the pituitary growth hormone, essential in maintaining the growth and differentiation of cells in young animals; injected into old animals, this hormone has actually produced some changes suggestive of youthfulness. There is no definitive evidence so far that the pituitary gonadotropins, which increase in old age, are responsible for senescence. The fact that thyroid function is reduced in old age points to this gland as a possible agent of decrepitude; known is that many symptoms of aging may be relieved by injection of thyroidal substances, many more by the use of sex hormones. Yet many hormone treatments recommended for old patients fail because the target organs lose their ability to respond. In old rats, the cells respond poorly to thyroxine. After menopause, the human ovary becomes refractory to hormonal stimulation; but the skin remains sensitive much longer.

In the aged, homeostasis is impaired, the physiologic resilience of youth is lost. This may be partly due to the disturbed balance of hormones or to the loss of responsiveness to them. Or it may be due to the weakening of the nervous system, which controls many of the vegetative functions. Increased susceptibility to stress in the aged is a familiar picture to every physician, yet where is cause and where effect?

Cells. More recently, physiologists have sought answers to the

problem in the cell. Old cells contain relatively more solids and less water than young ones. Colloids in test tubes also lose water when they age and one theory is that senescence is caused by a similar aging of the colloidal protoplasm. Latest evidence is that desiccation does not occur in the aged; instead there is a shift of water from the intracellular to the extracellular spaces; familiar to all is the extracellular edema of senescence.

Many aging cells accumulate lipids and pigments. Claimed by some is that these substances are the "ashes of the metabolic fires," which gradually accumulate and clog the cellular mechanism. Quite recently, British biologist Alex Comfort proposed the notion that old cells contain substances that are of no metabolic importance but that compete for essential enzymes with vital elements, thus reducing the amount of available enzyme.

The mitochondrion is today acknowledged as one of the most important sites of metabolism in the cell. This small, sacklike organelle is said to contain most of the enzymes required for the production of vital energy. The shape of the mitochondrion, long and slender, is necessary for efficient function; its more granular shape in old cells indicates that their function has changed; what has happened to mitochondrial function is still not known.

In the brain, abnormal mitochondria are most prevalent where vascular damage is most pronounced. To some, this means that the metabolic changes indicated by the mitochondria are secondary phenomena of aging, the result of poor circulation.

The surface membrane of the cell has recently achieved the status of an important organ, inasmuch as it contains enzymes essential to life and is the site of hormonal function. Calcium accumulates in the aging cell membrane, reducing its permeability. Biochemists have discovered that the proteins of aging animals have a greater calcium-binding capacity than those of young animals. Old proteins also differ from the young ones in their amino acid composition, but how this relates to aging is still unknown. One theory is that the cortex of the aging cell may actually lose calcium, becoming more permeable. The calcium then reaches the protein molecules in the depth of the cell, causing a "stiffening" of the protoplasm.

Generally accepted is the fact that mitotic division rejuvenates

aging cells, is essential for the prevention of senescence. Intermitotic cells can divide; postmitotic cells cannot. Only postmitotic cells age, and senescence may involve the gradual using up of cellular enzymes, which can be replenished only during mitotic division. Cultures of certain cells of primitive animals can be maintained nearly indefinitely when the dividing cells form completely new daughter cells. In some species one half of the dividing cell retains some of its original structures, while the other half must expand the effort to produce these structures anew. Oddly, the cell that wasted less effort (only partially renewed) is less vigorous than the cell that was rebuilt completely.

Old cultures of *Paramecium* suffer senescence and eventual death because of a genetic accident. The macronucleus of *Paramecium* is highly polyploid (many complete sets of chromosomes). At division, these chromosomes are distributed in a random fashion to the daughter cells. Normally, because there are so many sets of chromosomes, each cell receives at least one complete set. After many successive divisions, the chromosomes are so irregularly distributed that some cells receive incomplete sets and are not viable. Sexual reproduction, which normally occurs sporadically in *Paramecium*, serves to redistribute the chromosomes.

Recently discovered is that, during the aging process in human and other mammalian tissue, an unidentified secretion (possibly glandular) causes the production of cellulose, principal component of plants. Investigators at the Nuffield Gerontological Research Unit (Leeds, England) found this phenomenon while investigating two vital components of human tissue, elastin and collagen.

The physiologic field of aging is still wide open for research. One possible reason for the small number of researchers in the biology of senescence was tersely stated by Dr. A. I. Lansing. Said he: "An appreciation of the inevitability of aging no doubt dissuades many from dabbling in the problem."

Problem for the future is to coordinate the research of many disciplines, both in the human and in the animal worlds. Said Dr. E. V. Cowdry, a pioneer in gerontology: "The most desirable condition for progress in gerontology at the moment is that the exact nature and scope of the problems raised by senescence should be understood, and the possibility of new experimental

evidence borne in mind during planning and assessment of all biological research even when it is primarily directed to other objects. Senescence, like Mount Everest, challenges our ingenuity by the fact that it is there, and the focusing of our attention on it is unlikely to be fruitless."

Medical Problems. The rapid growth of geriatrics as a specialty in the last few years has brought out the fact that the diagnosis and treatment of many diseases are not the same in the aged as in younger patients. The same symptoms in a man of forty-five and one of seventy-five can indicate widely differing conditions. Here are a few of the most widely recognized geriatric problems.

Cerebrovascular. A survey done just over ten years ago of a random sample of older people disclosed that about half the number suffered from vertigo. A recent Finnish study showed a clear connection between such dizziness and the symptoms of cerebral arteriosclerosis; other causes were labyrinthine lesions, cardiac arrhythmias, and angina pectoris. Noted by several investigators was that hypertension was not a primary cause of dizziness.

Attention was focused in 1957 by Dr. Walter Alvarez on the possibility that many apparently unrelated symptoms may be caused by "little strokes" or minor cerebrovascular accidents; such symptoms include acute indigestion, epigastric pain, abdominal distention, rapid loss of weight, difficulty in swallowing, vertigo. The common clue in each case is a sudden change in the patient's personality: confusion, depression, irritability, lack of concentration.

Recognized in recent years is that sudden disturbances of cerebral function in elderly people do not necessarily originate in the cerebral vessels; the culprit may be a thrombus in the internal carotid artery.

A special problem on the American scene is that aging, in both men and women, is frequently accompanied by overweight or obesity, which in turn can lead to hypertension. Whereas hypotensive agents will generally benefit a younger person, the elderly patient with a cerebral disorder may react quite differently.

Generally acknowledged is that prevention and treatment of cerebrovascular disturbances in the aged depends a great deal on

the general circulation, hence the vicious circle in geriatrics: decreased activity=impaired circulation=cerebrovascular fragility.

Cardiovascular. A chronic problem in geriatric medicine is the diagnosis of myocardial infarct, relatively simple in younger age groups, sneakily deceptive in the aged. In one recent study, mortality from myocardial infarction was 46 per cent in a group over the age of seventy, compared with 17 per cent in the under-sixty's.

Common pitfalls: a sudden exacerbation of dyspnea may mask a "silent" myocardial infarct; symptoms of vertigo or mental confusion may be attributed to cerebral arteriosclerosis without suspecting coronary disease.

Cardiovascular disturbances in the aged pose another puzzle: the traditional treatment of bed rest in cardiac attacks further weakens a debilitated general circulation, possibly leading to a variety of other organic disorders. Championed by Dr. Samuel Levine is the method of treating cardiac patients in a chair instead of in bed.

Respiratory. One cause for the steadily growing proportion of aged people in the population is a by-product of the antibiotic age, the reduction in death from bronchopulmonary disorders.

Though chronic bronchitis is still a major problem in geriatrics, the death rate has been sharply reduced by the prophylactic use of small daily doses of a broad-spectrum antibiotic during periods of danger. Postoperative bronchopulmonary complications, which formerly discouraged surgery in the aged, have also become less fearsome.

Less easy to control is the rising incidence of chronic pulmonary tuberculosis in the elderly. Diagnosis is usually difficult, frequently the only symptoms are debility and loss of weight, both attributed to "normal" old age. The chief public health problem is that granddad who lives in a family constitutes a focus of infection. Studies have shown that long-term chemotherapy with streptomycin, PAS, and isoniazid is effective in the aged, even in cases of advanced pulmonary tuberculosis.

Nutrition. Acknowledged by all is that the progressive atrophy of muscle tissue and the reduction in functional protoplasm reduce an older person's caloric needs. But whether older people are less

efficient in utilizing the calories they ingest is still an open question.

Some theories current in geriatric circles: that older persons have reduced concentrations of digestive enzymes; some experiments do in fact show that blood levels of lipids and carbohydrates are more prolonged in the aged after a meal than in the young.

Protein deficiency in the aged is a common observation, but this does not necessarily prove that older persons need more protein in their daily diet than younger subjects. Empirical observation is that older persons, either through social, economic, or dental deficiencies, tend to consume a diet low in high-grade proteins.

The National Research Council allowance of 65 Gm. of protein per day is based on an estimate of 1 Gm. of protein per kilogram of body weight; as body weight decreases in the old, the excess protein allowance could compensate for less efficient utilization.

Apart from the suspicion at present thrown on certain fats as factors in atherosclerosis, nutritionists generally agree that the aged person takes longer to clear lipids from the blood stream, thus possibly aggravating chronic biliary tract or gall-bladder disorders.

Still unsolved is the problem of the older person's requirement of calcium; osteoporosis in the aged is a common finding. Suggested by some is that the loss of muscle activity may be related to a loss of calcium, hence the advantage of mild exercise for the aged.

Vitamin requirements in the aged are still a matter of controversy. Is the avitaminosis found in many aged persons the result of an unbalanced diet or does the aging digestive tract develop certain functional deficiencies that reduce the manufacture or absorption of vitamins?

Observed in several tests is that the amount of B_{12} in the serum tends to decrease with age; the blood levels of ascorbic acid and thiamin also appear to be lowered with the years. Factors possibly implicated: poor absorption of certain vitamins or failure to store adequate amounts; the tendency of older people to eat a diet high in carbohydrates may increase the demand for B complex vitamins. On several counts, nutritionists generally agree that older persons require vitamin and mineral supplements in their daily diet.

Mental-Emotional. The psychic stresses to which every person is exposed during life are augmented in the old by the

internal biologic stresses of an aging organism, thus presenting the physician with a double medico-social problem.

One handicap in making a study of mental deterioration with age is that an adequate curve would have to be plotted on the same persons from the age of twenty to eighty; studies that compare the young and old of today do not take into account that older persons received less schooling when they were young, living in an environment where less mental agility was required. Some studies made on individuals between the ages of twenty and fifty have shown an increase in intellectual capacities; longitudinal studies are still needed on changes between the ages of fifty and eighty.

Autopsy findings in the aged have in many cases been contradictory. Persons showing profound mental deterioration were found to have only moderate cerebral damage; others who preserved their mental health until an advanced age were discovered at autopsy to have suffered considerable deterioration of cerebral tissues. The policy of forcibly retiring persons from economic life at the age of sixty-five finds little support in scientific data.

Emotional disturbances in elderly people have been studied in various social groups; they are usually classified as periodic fits of depression, hypochondriasis, restlessness, irritability.

Depression has been observed more frequently in older than in younger age groups, sometimes accompanied by suicidal wishes. Hypochondriasis usually springs from an intensive interest in the biologic changes occurring in the aging organism. Restlessness has been observed in older people with an unsatisfactory family relationship. Irritability was found most frequent in older persons during the period of decreased muscular activity and coordination.

A rich source of mental-emotional disturbances in the aging was found in some studies to be connected with sex problems. Most frequent manifestation in the male was the fear of losing potency; in the female it was the fear of no longer being able to enjoy intercourse. Common misconception found in women of all social classes was that the menopause signaled the end of a woman's sexual life. Contrariwise, some older persons feel relieved to find that they have lost their sex drive, thereby achieve a new serenity.

Long-term scientific studies into the sex-life pattern of aging individuals have yet to be undertaken.

Environment. Agreed by most authorities is that the socio-economic environment in the United States is ill-suited to the process of aging. The emphasis of society is on youth and "drive," in spite of the growing proportion of older people.

A study done on over 60,000 persons in Japan in 1954 showed that the incidence of psychoses decreased after the age of fifty-five, and that the rate of mental-emotional disorders was lower than in European and American societies.

One possible explanation: in the patriarchal society of Japan the old are respected and revered, never have to fear that they will be abandoned by their children or pushed into old age institutions.

Numerous geriatric and sociologic studies have shown that the fear of loneliness or abandonment by a family is a powerful element in the mental-emotional disturbances of the aged in the United States and some European countries. Younger members of the environment may feel hostile toward older people because they are ever-present reminders of decrepitude and death; the fear of death in the aged in turn can engender hostility toward the young and healthy.

Noticed also is that a change in the socio-economic environment of an old person (particularly after retirement) can produce a radical change in adaptive mechanisms developed during a lifetime: neuroses that were kept under control for many years will flourish, long-repressed fantasies or longings are activated; one most common manifestation is chronic invalidism, seen by some psychiatrists as an unconscious attempt to continue domination over a family or to work out aggressive impulses.

Remedies. There is ample evidence that the over-all medical problems of the aged are being seriously considered by American community and public health services, though a national gerontologic program is still in its infancy.

Launched in 1957 was a broad program of projects directed by the United States Public Health Service, under the coordination of Dr. A. L. Chapman, head of the Division of Special Health Services.

One program will include field screening of aged persons for

diabetes and glaucoma, also cytologic examinations for cancer; aged people receiving public assistance will be given periodic health examinations.

Research projects envisioned in the over-all plan will include three departments in the National Institutes of Health: the Center for Aging Research, the Section on Aging in the Institute for Mental Health, and the Gerontology Division in the National Heart Institute. Proximal goal is the establishment of some ten gerontologic centers in universities, which could serve as coordinating centers.

Organized community programs in various parts of the country generally follow this pattern:

1. Campaigns to educate older persons in the importance of early diagnosis and periodic check-ups; example: a "well older conference" in Nashoba, Massachusetts, sponsored jointly by the Worcester District Medical Society and by the local health department.

2. "Common denominator" services such as organized home care, homemaker services, rehabilitation services to relieve the crowding of hospitals.

3. Improved housing facilities for the aged, including group units based on the most modern architectural know-how.

4. Recreation, counseling, and adult education facilities.

Summing Up. Somerset Maugham once wrote: "For the complete life, the perfect pattern, includes old age as well as youth and maturity. The beauty of the morning and the radiance of noon are good, but it would be a very silly person who drew the curtains and turned on the light in order to shut out the tranquility of the evening."

For the medical profession, the steadily increasing problems of an aging population pose a challenge to the physician both as a healer and as a community leader.

Disease and Man



Disease is very old and nothing about it has changed. It is we who change as we learn to recognize what was formerly imperceptible.

—J. M. Charcot: *De l'expectation en médecine* (1857)

From demons to differential diagnosis, from miasmas to myelography, the story of disease is the story of man himself, his physical changes and mental development. Pestilences toppled empires, microscopic organisms brought low mighty rulers, disease and death stalked through millennia of history virtually unopposed.

The miracle of it is that the human race not only survived but multiplied. Another miracle is that human beings survived their own attempts to fight disease, ranging from talismans to massive bloodletting; in the history of civilization, man was frequently more dangerous to man than any microbe. For physicians who are forever interested in the very essence of their dedication, *MD* here presents an over-all view of disease and therapeutics.

History. During the half million or so years that human beings roamed the earth as food-gatherers, it is probable that they were not too severely plagued by infectious diseases. One reason is that paleolithic communities were small and constantly on the move, thereby eliminating the danger of excreta and putrefaction as sources of infection. Another reason: the sick might be killed or

left to die by the wayside, thereby reducing the danger of cross-infection. Yet their shelter-less existence must have exposed them to respiratory tract and internal diseases.

The development of specific disease entities in the form known to recorded history paralleled the growth of settled communities about 15,000 years ago. One plausible theory is that the domestication of animals by Neolithic Man also influenced the spread of pathogenic organisms in man: e.g., *Mycobacterium* exists in bovine and avian forms.

Wrote British bacteriologist Dr. Ronald Hare: "Consideration of all the available evidence forces us to the conclusion that man did not bring many of his pathogenic parasites with him in the course of evolution."

Known through the painstaking work of paleopathologists is that certain modern diseases can be recognized in ancient human remains. Skeletons showing Pott's disease have been discovered in predynastic Egyptian burial grounds; Sir Marc Ruffer found evidence of pneumonia in a mummy of the XX Dynasty (1250-1000 B.C.), also the calcified eggs of *Schistosoma hematobium* in the kidneys of two mummies of the same period; some Egyptian tomb paintings depict what appear to be poliomyelitis, acromegaly, and eunuchoidism. Man also appears to have suffered a variety of mouth diseases from the earliest times, notably pyorrhea and tooth abscesses.

The *Iliad* was written about the ninth century B.C.; it describes a pestilence sent by Apollo against the besiegers of Troy. In the Hippocratic books that appeared about four centuries later there are clear references to conditions such as typhoid fever, meningitis, puerperal fever, erysipelas, osteomyelitis, dysentery, and diphtheria.

The ancient Greeks also seemed to have been particularly vulnerable to pulmonary tuberculosis of a rapidly fatal variety. One of the Hippocratic books describes what seems to be tetanus, also an epidemic resembling influenza; other epidemics included mumps and infectious hepatitis.

The Bible contains detailed direction for diagnosing leprosy, also refers to the treatment of "issues," which may have been gonorrhea or purulent discharges from scrofula. Hapless Job was afflicted with what some believe to have been eczema, apparently

a common affliction among the early Israelites. Other diseases mentioned in the Bible include dysentery, dropsy, apoplexy, and mental aberrations, such as that of King Nebuchadnezzar who took to a diet of grass.

Little is known of the history of disease in Asian countries. Pulmonary tuberculosis was prevalent in India from the most ancient times (called the "royal disease"), so were tertian and quartan fevers; smallpox is described in one of the earliest Indian books of medicine. Ancient Chinese texts mention epidemics of smallpox, against which inoculation was apparently practiced.

Concepts. Paleolithic man most probably dealt with his diseases, as many animals do, intuitively. He licked his wounds (ignorant of lysozyme), bathed a fevered body in cold water, extracted foreign bodies, killed body vermin. With the rise of settled communities came the beginning of contemplation: man's early communion with cyclical phenomena in his environment—stellar movements, tides, river floods, the cycles of herbal growth.

Out of this change evolved three main lines in man's concept of disease: the magico-mystical, the empirical, and the rational.

Magical. Line of thought: If some gods can bring life and warmth, others may equally purvey darkness and death; a bountiful god may in its wrath change into a fount of disease. Thus on Assyrian tablets (c. 2500 B.C.) it was written:

*Sickness of the head, of the teeth, of the heart, heartache;
Sickness of the eye, fever, poison;
Evil-spirits, evil-demons, evil-ghost, evil-devil, evil-god,
evil-fiend.*

The task of the healer was then to expel disease with the help of exorcism: malignant spirits might be frightened out of the patient by producing terror or ecstasy.

The demoniac concept of disease persisted for centuries in many cultures, flourishes even today in some primitive tribes. In the Middle Ages in Europe it held sway in the field of mental diseases. Also prevalent was the astrologic concept, which saw health and disease as part of a vast cosmic movement of stars and tides.

As all the earliest physicians in the Babylonian and Egyptian

civilizations were also priests, the magico-religious concept of disease became an integral part of vastly complex ritual systems, to which were skillfully added the use of drugs and surgery. But the notion of the healer as a magician persisted among Oriental peoples until the time of Christ.

Greek. The momentous revolution in man's concept of disease is traced by some to philosopher Alcmaeon of Croton (sixth century B.C.), who conceived the notion of *isonomia*: the harmony of all substances composing the human body. Disease thus became merely an expression of a disturbed harmony. His also was the new idea that the individual constitution could influence the occurrence of disease, and that environment (climate, topography) could cause a disharmony in metabolism.

These notions (developed later by Empedocles of Agrigentum) formed the basis of the humoral pathology, which dominated medical thought for some twenty centuries. The body's four humors: blood, phlegm, yellow and black bile were in some fashion in harmony with the four elements: air, fire, water, earth. Each element in turn varied in its qualities of heat and cold, wetness and dryness: these variations by operating on the four humors produced disease.

This ecologic concept of disease flowered in the Hippocratic school during the fifth and fourth pre-Christian centuries. Hippocrates stated clearly that there was a causal relation between the type of disease suffered by individuals and their physique and habitation. In a district of hot winds "the heads of the inhabitants are of a humid and pituitous constitution and their bellies subject to frequent disorders owing to the phlegm running down from the head." Townspeople exposed to cold winds "must have the discharges downward of the alimentary canal hard and of difficult evacuation, while those upward are more fluid and rather bilious than pituitous." Hippocrates and his disciples also noted that some diseases varied with the seasons: respiratory infections prevalent in winter, fevers (probably malaria) in summer. For diseases which broke out without relation to locality or season he coined the term epidemic.

Noted further by the Hippocratic school was that a healthy physical regimen and moderate diet increased resistance, excesses

or undernourishment upset the humoral balance and encouraged illness.

The Hippocratic *nosos*, or the concept of disease as the sickness of an individual, suffered from one serious fault: it did not admit that diseases could be transmitted from individual to individual.

In the centuries following Hippocrates, the original humoral concept was left virtually intact, was merely modified to include transmissibility. Galen (second century A.D.) declared that phthisis, ophthalmia, pestilence (probably smallpox), and some skin diseases were communicable. By the tenth century of the Christian era, the great Persian physician Avicenna was firmly convinced that certain diseases could be transmitted from house to house or even from a house downwind from another; he added hereditary transmission for vitiligo alba, premature baldness, gout, phthisis, and leprosy.

Miasmas. The brilliant Arabian school of medicine that flourished while most of Europe was plunged in the Dark Ages contributed a vast amount of pharmacologic knowledge but added little to the basic concept of disease. Side by side with the Hippocratic concept of humoral balance grew the hardy concept of "miasmas" or emanations as the cause of many diseases.

Germs. The first significant change in the concept of contagious disease appeared in Venice in 1546 with the publication of *De contagione et contagiosis morbis* by Italian physician Gerolamo (Hieronymus) Fracastoro (1478-1553). In this work, far ahead of its time, he declared that some type of particulate matter (called "germ") passed from patient to patient in certain forms of disease. On three types of contagion he wrote: "The first infects by direct contact only; the second does the same, but in addition leaves fomes, and this contagion may be spread by means of those fomes, [e.g., infected clothing] for instance scabies, phthisis, bald spots, elephantiasis and the like." Added he categorically, in defiant opposition to Hippocrates and Galen: "I say germs, not simple vapors, for there is a great difference between germs and vapors."

Physiology. The so-called "physiologic" concept of disease in the first half of the nineteenth century was largely that of the French school led by dogmatic François-Joseph-Victor Broussais (1772-1838). This postulated that vital phenomena were subject

to external stimuli (such as heat), which in turn produced chemical changes in the tissues: when the stimuli were either too weak or too strong, the body became diseased. Contrary to Hippocratic doctrine, the physician should not merely assist nature but dominate it; this could best be done by powerful antiphlogistic or debilitating treatment. Contemporaneously, when the great cholera epidemics began to strike Europe (and the United States), the old notions of emanations and miasmas were revived.

As early as 1851, the great French physiologist Claude Bernard launched a broad new concept of health and disease in these terms: "Health and illness are not two essentially different functions, as ancient physicians believed and as some still believe today. They must not be established as distinct principles, as entities that fight for the living organism while making it their battlefield. These are outworn medical ideas. In reality, there are between these two ways of being only differences of degree: exaggeration, disproportion, disharmony of normal phenomena constitutes disease. There is not a case where disease caused new conditions to appear, or caused a complete change of scene, with new and special products."

Inherent in this concept was the new notion that disease was merely the result of a deviant physiology. A great deal of modern medical thinking is based on Bernard's profound insight over a century ago.

Chemistry. The momentous discoveries of Pasteur and Koch in the second half of the nineteenth century coincided with the vast growth of the chemical industry, particularly in Germany. The search for pathogenic organisms ran neck and neck with the discovery of antiseptics, disinfectants, bacteriotoxic substances. The post-Ehrlich enthusiasm for the chemical "magic bullet" promised a new golden era in medicine in which microscopic parasites would get short shrift. It received a powerful stimulus with the advent of the sulfonamides and antibiotics, strengthening what has been called the "etiologic" concept of disease. Like many of its predecessors, this concept proved to be an oversimplification.

Disease Today. The concept of disease in the second half of the twentieth century abounds in theories, is enormously rich in

laboratory data, spans a dozen disciplines. Here are some of its main bases:

Infection. Every human being carries through life a familiar baggage of parasites, some actively pathogenic, others benign or in a state of dormant virulence.

Still largely unknown today is why certain microbes are capable of infecting one species of host and not another, why some microorganisms have an affinity for certain organs, how a seemingly innocuous parasite can be changed into a pathogenic one.

The role of viruses in infectious disease is not as clear as that of bacteria, probably because the very nature of a virus is still in doubt. Two main theories have their adherents: a virus is a living organism, much smaller than a bacterial cell and with a simpler chemical constitution; Pasteur himself thought that viruses were merely small microbes. The opposite view, popular since about 1935, is that a virus is a nonliving crystalline structure capable of autoreproduction.

Before 1910, the only known viral diseases were rabies, poliomyelitis, smallpox, vaccinia, cowpox, yellow fever, dengue, and phlebotomus fever. In the next ten years were added measles, varicella, herpes zoster (and simplex), inclusion conjunctivitis, and verrucae; the list steadily grew to include influenza, psittacosis, lymphogranuloma, mumps, rubella, adenopharyngeal-conjunctival diseases (adenoviruses), and enteric disorders (ECHO).

Virology as a special field of research is essentially a child of the electronic age with its enormous powers of magnification, of modern biochemistry with its techniques of molecular analysis. It has expanded the concept of infectious disease to the very threshold between living and nonliving matter.

Host. When the germ concept of disease was in its prime at the turn of the present century, it was generally accepted that invading organisms caused most of their harm by releasing toxins inside the host; this was another oversimplification, which modern research has profoundly modified.

An infectious disease is now seen as a complex interplay of forces between the invading organism and the host's metabolism. Pathogenic bacteria can be destroyed either by phagocytosis or by antibacterial substances in the body fluids, such as lysozyme, an-

tibodies, and complement. But the invaders are themselves armed with counter-weapons such as antigens and haptens, staphylocoagulase, leucocidin, staphylokinase and streptokinase, nuclease, and proteolytic enzymes; in addition, many gram-positive bacteria produce the enzyme hyaluronidase, which breaks down the body's tissue-cementing substance (hyaluronic acid) and promotes diffusion in the tissues.

These complex interactions would be confined to biochemical warfare were it not for another factor formulated in the last two decades: nonspecific stress. Established by Montreal's Dr. Hans Selye in 1936 is the theory that the body responds in a stereotyped fashion to a number of insults: infections, intoxications, trauma, nervous strain, irradiation. The adrenal cortex produces two types of antagonistic hormones: the anti-inflammatory agents, such as cortisone and ACTH, and the proinflammatory agents, such as desoxycorticosterone, aldosterone, and the somatotrophic hormone. When stress is prolonged, the body's adaptive mechanism breaks down and there is loss of resistance.

The Selye concept further stipulates that an individual's total response to the stress of infectious organisms depends to some degree on inherited somatic factors, on previous experiences with similar stresses, on diet or climate. When the stress response is unable to deal with a potentially disease-producing situation, it develops what Dr. Selye calls a "disease of adaptation."

Also noted in recent times is that most of the commonly used antibiotics have apparently reached a plateau of antibacterial effectiveness. Wrote Dr. Henry Welch (director, FDA Antibiotics Division) in 1957: "With the antibacterial antibiotics now available, the therapy of infectious diseases has reached a point at which consideration has to be given to improving host resistance." This has been done by several clinicians in transferring specific antibodies (gamma globulin or specific immune sera) or by antigenic stimulation of the delinquent host, all under an antibiotic "umbrella."

Cell. In the old humoral concept, disease seemed to float all around the body; later it was localized in the organs, then in one particular organ, finally in tissues and cells. At the cellular level,

disease is today seen as disturbance of biochemical and biophysic equilibria.

The hypothesis of France's Dr. Henri Lahorit and others is that the electrical potential of a cell membrane is governed by the balance between potassium ions inside the cell and calcium ions outside; this potential regulates the permeability of the membrane and consequently determines whether viruses and other foreign proteins will be able to enter a cell.

According to this theory, the cell functions as an autoregulated system similar to the feedback mechanism in cybernetics. The system is under the control of hormones and neurohormones; it follows that when aggression of any kind (e.g., infection) strikes the body it sets off stress reactions (vide Selye) that upset the hormonal balance and disrupt the ability of a cell to resist invasion. The theory would explain why environmental or emotional shocks frequently allow a foreign organism in the body, hitherto dormant, to become pathogenic.

A cell membrane is composed of molecules, each with a characteristic pattern of atoms, bonded together to produce a stable state. Energy from outside excites the atoms, can cause a "quantum leap" from one stable state to another; this is what usually happens when molecules are submitted to heat or radiation.

The concept of disease is thus still further extended into the realm of microphysics, explaining theoretically how it is possible for the equilibrium of a cell to be disturbed by natural or artificial radioactivity, atmospheric ionization, heat and cold, chemical or mechanical reactions (producing heat) in the cellular environment. In modern medical research, the frontier between biology and physics is now all but obliterated.

Metabolism. Although rheumatic diseases have plagued mankind for uncounted centuries, their cause is today still largely hypothetical. Known is that the etiology of rheumatoid arthritis ruins virtually the entire gamut of human metabolism. Precipitating factors include: severe physical or emotional shock, fatigue (mental or physical), local trauma, infection, exposure, body constitution, heredity, climate, allergy, hormonal dysfunction.

Fifty years ago, the disease was thought to be caused by infection, then allergies were blamed. Most recent hypothesis is that

some toxin manufactured in the body attacks connective tissue, the toxin may be the by product of an allergy. Discovered two years ago was a test for rheumatoid arthritis, using bentonite sensitized with gamma globulin, proving fairly conclusively that the blood of rheumatic patients contains a long suspected "rheumatoid factor."

Equally mysterious still is atherosclerosis, a degenerative process that emerged as a prime medical problem only since the longevity of populations increased. Predisposing factors are age, sex, race, heredity, hypertension, physical activity, metabolic disorders, and previous infarctions, the influence of diet is still under debate.

Better understood are the diseases of the ductless glands, the modern specialty of endocrinology born out of Claude Bernard's historic experiments that led to the concept of internal secretion. This discovery and the innumerable experiments that followed enriched the over all concept of disease with a new factor, namely, that the body contains a closed 'humoral' system of interlocking glands exerting their control over every part of the anatomy and physiology.

The new discipline of endocrinology also served to close the gap between psyche and soma by demonstrating that emotions can disturb the hormonal equilibrium, which in turn can cause a lesion of dysfunction in a target organ. Concurrently, much is known on the effect that hormonal dysfunction can have on personality.

Psychology The concept of disease during the second half of the nineteenth century (apart from the germ theory) was mostly dominated by notions of pathologic anatomy, trivial lesions found at autopsy were frequently used to 'explain' a disease. Major turning point was Walter B. Cannon's thesis on the "wisdom of the body," followed by the experience of many World War I physicians who noted thousands of cases of psychogenic somatic disorders.

Generally accepted today is that psychic factors predispose to gastric ulcers, cardiovascular disorders, asthma, and other respiratory dysfunctions, dermatologic, and nervous diseases. The concept of disease is thus still further enlarged to include the psychosomatic disorders.

Genetics Hippocrates was aware that the constitution of an individual might predispose him to certain diseases, but he lacked

the statistical data needed to link specific diseases with hereditary factors. Even today genetic data are scanty, largely because, as a cynical biologist once stated, human beings are miserable specimens for genetic experimentation.

Yet there is enough evidence today to implicate hereditary factors in cancer, diabetes mellitus, rheumatoid arthritis, angioneurotic edema, atherosclerosis, epilepsy, hypertension, leukemia, polycystic kidney disease, possibly schizophrenia.

Geo-climatology. In the Hippocratic book *On Airs, Waters, and Places*, it is written: "Whoever wishes to pursue properly the science of medicine must proceed thus. First he ought to consider what effects each season of the year can produce."

Common knowledge is that certain diseases pass through seasonal variations. Not so commonly realized is the part played in history by a time-space relationship between genotype, environment, and the various attempts made at adaptation.

Geographer-physician Dr. Jacques May defines disease as "that alteration of the living tissues that jeopardizes survival in their environment." Disease thus becomes synonymous with "maladjustment" and a threat to survival in a particular environment, bringing it into the field of medical ecology.

One ecologic problem currently under medical scrutiny is the relationship between the polluted atmosphere of cities and the incidence of various diseases, notably lung cancer. Another is the effect on human health and heredity of the growing use of radioactive materials. The disciples of Hippocrates today are less concerned with the temperature of winds than with their strontium content.

Concept Today. The nosologic concept of disease that prevailed for centuries after Galen is today being replaced by the holistic approach: instead of concentrating on specific causes, the modern tendency is to look for correlations.

The holistic approach returns to the Hippocratic view of the whole patient: the product of genetic origin, environment, and free will. Disease thus becomes a deviation from normality, the by-product of chemical or biophysical imbalances, or of inbuilt weaknesses. It is also a subtle and enormously complex interplay of forces between tissues and the insults they receive. It is often

the result of the organism's determined (and frequently exaggerated) attempt to maintain its homeostasis. Briefly, it is an integral part of man himself, a biographic accident in the course of living.

Therapy. Ancient Greek medicine managed for centuries to reconcile two dissimilar schools of therapy: the Hippocratic humoral doctrine and the Aesculapian "incubatory dream" treatment, i.e., empirical medication versus psychotherapy. Yet both were based on a similar therapeutic formula: patients should set their metabolism in order by baths, exercise, massage, and a simple dietary regimen. Both were also based on a simple observation: that nature maintains her own curative processes, which require only a little help from man to restore health.

The great therapeutic controversies that raged for centuries after Galen until recent decades revolved around two main points: How much help should man give nature in the fight against disease? What products in nature could be used to help the body's natural resistance? Around these two key issues were built therapeutic schools that advocated "vampiric" bloodletting, purging, a wondrous choice of animal, vegetable, and mineral substances, ranging from antimony to the powdered horn of the mythical unicorn.

During those centuries, therapy was tenaciously dominated by the "foreign body" notion of disease, leading to eliminative treatment based on phlebotomic and cathartic extravagance. In some ways this concept was not too far removed from the earlier notion of curing disease by eliminating demons.

The controversies of yesteryear are today largely stilled. Therapy is many-sided, not hemmed in by any rigid dogmatism. Here are some of its modern aspects.

Serotherapy. Although considerably restricted since the antibiotic-chemotherapy era began, serotherapy is still used in such accidents as diphtheria, tetanus, and botulism. In spite of the remarkable progress made in biochemistry, no more effective means of destroying bacterial exotoxins has yet been discovered.

Vaccinotherapy. The ancient Chinese are reputed to have introduced smallpox scabs into the nose to achieve immunization; Circassian women were reported in the eighteenth century to prick the body with needles dipped in smallpox pus. Vaccinotherapy

entered medical practice through the empirical observation of simple peasants exposed to cowpox, combined with the patient scientific inquiry of Edward Jenner (1749-1823). The principle of building up the body's resistance against invading organisms is still an active element in therapy, although the rapid rise of chemotherapy has restricted its field. Most likely in the future is that vaccinotherapy will concentrate on the numerous viral diseases that still elude prevention or treatment.

Chemotherapy. Ehrlich's chromotherapy and arsenotherapy first, then the sulfonamides, finally the antibiotics dramatically changed the course of history; they did more by altering the concept of treating a disease.

Whereas in Sydenham's time the main task was to treat a disease as a whole, modern chemotherapy at first tended to concentrate on the etiologic agent of an infection. Result: the clinician was forced to lean more and more heavily on the laboratory to correlate the *in vitro* with the *in vivo*, reducing the patient to a scientific formulation of a generic disease.

The reaction against this etiologic concept of therapy came, unexpectedly, from the microbes themselves. Certain antibiotics were able to arrest or destroy a pathogenic organism, but in doing so they upset the body's balanced bacterial flora, or left the field open for the spread of fungi. Alternately, the microbe either developed resistance to a drug, or it altered its metabolism to make the drug part of its diet.

This seesaw battle between chemotherapy and the microbial population had one salutary effect: it forced the clinician once more to see the patient as a whole organism, not merely as a battlefield between a microbe and a drug. Pasteur's dictum: *le germe n'est rien, le terrain est tout*, was vindicated after some seven decades.

Hormonotherapy. Since the days in the latter part of the nineteenth century when Charles Edward Brown-Séquard (1818-94) experimented with testicular and other organ extracts, hormonotherapy has grown into a vast clinical specialty. The number of known hormones increases year by year, clinical experiments are extended into numerous metabolic diseases (with varying degrees of success).

The earlier concept of hormonotherapy as acting directly on a

target organ was in the last few years replaced by a more holistic view: that the general reactions of an organism, certain cellular functions, and the defense reactions (immunologic and others) are all intimately linked and under the control of hormones. The hormone therapy of the future was expected to deal less with specific organic dysfunctions and more with strengthening the defenses of tissues and the patient's organism as a whole.

Atomotherapy. The marriage between atomic physics and biology belongs to the twentieth century entirely, is still in its experimental stage.

Apart from the now conventional use of x-rays or gamma rays, the future of atomotherapy seemed to lie in "neutron-capture-therapy," now experimentally used in cancer. The underlying mechanism: invade undesirable cells with a substance (e.g., boron), bombard with neutrons; when a neutron encounters a boron atom there is a burst of energy inside the cell, which may destroy it without harming adjacent tissue. Another promising field: the use of "radiosensitizers" (e.g., a synthetic form of vitamin K), which render cancer cells more sensitive to x-ray treatment.

Psychotherapy. The most vivid link between concept and therapy in medicine shines through the history of psychotherapy. The ancients observed that mentally ill people seemed to lose control over their actions: *ergo* some other force must be moving them, some incorporeal being. For the Biblical sages, insanity was an act of Jehovah and only divine intervention could effect a cure. For the pedantic scholastics of the Middle Ages, the mentally ill were possessed of the devil, for which the surest remedy was burning.

In the so-called Age of Reason (eighteenth century) it was still believed that the insane were sinners who must be locked away from society; it required the courage of a Philippe Pinel (1745-1826) to impose a more humane view of insanity as an illness. He equally pioneered in affirming that the origin of mental disease lay in pathologic changes in the brain itself.

The history of psychiatric therapy until modern times included every manner of shock treatment: cold baths, rotary "spits" to induce a semi-coma, ascending douches, and a plethora of drugs to reduce the "phlogistic" dear to Broussais.

In modern times, organic therapy in psychiatry passed through intensive experimental therapy: induction of fevers, arsenicals, insulin coma, electroshock, injection of air in the cerebral ventricles, prolonged sleep, hypnotherapy, cerebral surgery. Concurrently, the psychoanalytic method sought for the cause of neuroses and psychoses in infantile psychic traumas or in the inability of a patient to adjust to the "slings and arrows" of life.

More recently psychotherapy passed into what some term the physiodynamic phase, searching for the cause of mental illness in a metabolic imbalance that causes a breakdown in communication between various parts of the nervous system.

The present-day approach to mental therapy is organicistic and threefold: temper the severity of symptoms through such drugs as tranquilizers, establish better communications between patient and psychiatrist, search for the biologic cause of mental disease.

Therapy Today. The physician today disposes of a hatterry of resources designed to treat not only one aspect of a disease but the entire patient: laboratory tests of the body fluids and tissues, electronic tests of nervous function, metabolic tests, tests for pathogenic organisms. Patients can be calibrated, titrated, cardiographed, and photographed inside and out.

The whole approach of medicine thus seems to be changing direction: less concerned with diseases "from without" (trauma, toxicity, infection) and more attentive to diseases "from within," degenerative, metabolic, and psychotic.

Therapy is no longer held back by the obscurantism of the Middle Ages or the dogmatism of the last century: for every timorous clinician there are five ready to try out a new treatment. The medical profession no longer fears disease, it accepts its challenge.

Patterns of Disease. Some bold prognosticators predict that by the year 2,000 a disease caused by invasive pathogens will be considered as much of a curiosity as smallpox is in the Western world today.

True it is that the deadly diseases of a few decades ago have been replaced by the insidious diseases of an aging population, notably cancer and cardiovascular degeneration.

The changing pattern of disease is thus radically altering the

pattern of human populations. Malaria, cholera, tuberculosis, and trachoma still cripple or kill millions of people in the Middle East and Asia, but the international medical services such as the World Health Organization are slowly bringing these ancient scourges under control. The population of the world, which now doubles every century, is expected to show a sharp rise for several generations, thereby intensifying the problem of adequate nutrition.

The social implications in the Western countries of the changing pattern of disease are: a preponderance of older people and an excess of females over males. Yet some economists believe that the lowered productive capacity of an aging population will be more than offset by the benefits of automation.

The steady conquest of infectious diseases is also changing the goal of medicine from cure to prevention. Instead of miraculous cures, the trend of tomorrow will accelerate the education of people in personal and public hygiene.

Yet the future is by no means so easily predictable. The steadily accelerating tempo of modern life may impose an over-all metabolic stress that no amount of therapy, however holistic, will be able to prevent from causing Selye's "diseases of adaptation." Some believe that just as typhus was a concomitant of filthy living conditions, metabolic diseases are an integral part of urban-industrial societies.

Summing Up. The concept of disease has in the course of four thousand years been refined from the demonic to the atomic; the concept of therapy has progressed from specifics and mumbo-jumbo to the holistic treatment of the patient as a whole organism. In the light of such a medical philosophy the outlook for patients and physicians is hopeful indeed.

Words and Science



Men believe that their reason governs words; but it is also true that words react on the understanding; and this it is that has rendered philosophy and the sciences sophistical and inactive.

—Francis Bacon: *Novum Organum*, I, 1620

Of all the tools fashioned by man, few are nobler and more constructive, at the same time more troublesome and perverse, than words. Throughout history they have alternately advanced and retarded science, have furthered both enlightenment and obscurity.

For physicians who depend on words in practice, teaching, and research, *MD* here presents a survey of language and its vagaries.

Beginnings. Primitive man probably attached meaning to his grunts and groans at about the same period when he fashioned the first crude implements. At present, no human group however primitive lacks a language. Anthropologists and philologists agree that toolmaking and word-spinning must have started at about the same time: remains of *Pithecanthropus erectus* and similar primitive beings show the same close relationship between the speech and hand centers of the brain that exist in modern man.

A legendary explanation of the origin of language is that it came full-blown from God; a variant of the story is the Biblical account

of the Tower of Babel where Jehovah intervened to confound the tongues of men and thwart their ambitious endeavor. A curious echo of these legendary accounts was advanced by a modern Swedish philologist who speculated that in the Garden of Eden, Jehovah spoke Swedish, Adam Danish, and the serpent French. At a 1934 Turkish linguistic conference, one student of language (a Turk) argued that Turkish was the basis of all languages, since all words ultimately derive from the Turkish word for sun (*güneş*), the first thing that primitive man must have thought of naming.

Some ancient Greek philosophers explained the beginnings of language in terms of "nature" or inherent necessity, without pursuing the matter much further. Others, including Democritus and Aristotle, believed that language arose by "convention" or "agreement," did not explain how wordless men negotiated such an agreement.

The eighteenth-century philosopher Gottfried Leibniz theorized that all languages sprang from a single primitive or proto-speech; recently a modern philologist asserted that the story of the Tower of Babel could be figuratively true, since all tongues sprang from a single root.

Charles Darwin advanced the theory that speech was nothing more than a kind of mouth-pantomime, in which the vocal cords unconsciously tried to mimic the involuntary gestures of the hands. In a similar vein, modern linguist E. H. Sturtevant believes that language probably began as an effort to hide the emotions and intentions of involuntary gestures, looks, or sounds.

A favorite theory today is popularly known as the "bow-wow" theory: it holds that man began to talk by imitating the sounds in nature. The noise of a dog's bark would thus be rendered as bow-wow. Main weakness of the theory: different people apparently hear the same natural sound quite differently; "cock-a-doodle-doo" to the Englishman is *chicchirichi* to the Italian or *cocorico* to the Frenchman.

The "pooh-pooh" theory traces language to primitive cries of surprise, fear, pain, and other so-called instinctive noises. Critics note that few peoples emit the same "instinctive" sounds for a given feeling: the English "ouch" corresponds to the Spanish "*ay*."

Closely related is the "yo-he-ho" theory, which holds that language began with the natural grunts and groans that accompany hoidly exertions, especially in tasks performed in common; words such as *heave* and *haul* would be primitive survivors. The "sing-song" theory is similar to the "yo-he-ho" theory, maintaining that language began with primitive group or community chants, comparable to lallation in children.

Almost as obscure as the origin of speech itself is the origin of writing. The earliest steps apparently were knots, a notched stick or other mnemonic sign that had meaning for the maker or a few others. In some civilizations such mnemonic aids reached a high degree of refinement, could convey historical events, laws, edicts. The most elaborate were the *quipus* of pre-Columbian Peruvians, consisting of differently colored threads hung from a crossbar. Each town in ancient Peru apparently had an official whose job was to decipher the *quipus*, but quite probably he needed an oral explanation to interpret a message from a distant part of the country.

Long after the development of writing, such crude forms of communication were often common among the illiterate. A classic example is that related by Herodotus about Persian king Darius I: during his Scythian expedition (c. 515 B.C.) he left a group of soldiers to guard a bridge, gave them a thong with a number of knots representing the days they were to stand guard.

Precursors of modern writing were the cave drawings of pre-historic man; at some point these figures became impressionistic and stylized, eventually formed the earliest pictographs, in which each word is a miniature representation of an animal, object, or action.

The next step was the combination of pictographs to form ideographs, as modern Chinese joins the symbols for sun and moon to represent "bright," or those for woman and child to obtain "happy."

The first to change from drawing to writing may have been the ancient Sumerians who lived in the Tigris-Euphrates valley more than five millennia ago. Crude Sumerian pictographs appear as early as 3000 B.C., but within a few centuries these were already greatly simplified. Originators of the script apparently were priests and

administrators who needed a system for keeping track of religious property and activities. By 1900 B.C. the script bore only the most fanciful relationship to the earlier pictographs; part of the drive to simplify apparently came from the urge for greater speed, part may have stemmed from the writing materials used (triangular stylus on clay tablets).

Ideas expressed in the cuneiform writing became more complex; many characters remained basically pictographs, some became complex ideographs (which did not always correspond to actual words of the spoken language), others came to represent syllables of spoken words.

Babylonians, Hittites, Egyptians, Chinese, Mayas, and Aztecs developed a system of writing much like the Sumerian, but none evolved an alphabet. The closest approach was a type of syllable writing sometimes sprinkled among ideographs. In Egypt, scholar-priests often toyed with combined symbols of unrelated words to form entirely new words, e.g., a combination of "bee" and "leaf" to make "belief."

The curious fact remains that while the Egyptians were so inventive in arts and crafts, they made so little progress with their written language, possibly because the priests chose to maintain their monopoly of words.

The transition from basically ideographic writing to an alphabet probably occurred when less cultured outsiders came in contact with the Egyptians; an illiterate people might have mistaken the names of objects represented by various symbols as simply the sounds of each character.

Through inscriptions found in the Sinai Peninsula, dating from about 1500 B.C., archeologists can trace the transformation of many Egyptian word symbols into sound symbols of a script intermediate between the old ideographic writing and an alphabet. Many Sinaitic inscriptions carry picture-symbols plus the name of the object in alphabetic characters, clearly suggesting that picture-symbols were prototypes of the new sound-symbols.

The word *alphabet* itself inferentially supports this theory of transition: it is the Greek version of the Semitic *aleph* and *beth*, first two letters of the early Semitic alphabet; effectively *aleph* means ox, and the letter A began life as a picture of an ox head;

beth means house, and B started out as a pictograph of a house.

Once the notion of using symbols to represent sounds developed, it apparently spread rapidly. Greek legend recounts that Cadmus of Thebes brought the alphabet from Phoenicia about 1500 B.C., but most scholars believe that it happened later. The biggest improvement made by the Greeks was to give vowel sounds to some of the Semitic letters, all of which were consonants, and add a few of their own. The Etruscans later took over the Greek characters, modified them and passed them on to the Romans, who made further changes before giving the Roman alphabet to western Europe.

Another version of the alphabet emerged in the fourth century when Bishop Wulfila invented one for his translation of the Bible into Gothic; after the Roman Empire absorbed the Goths their alphabet died out.

The Cyrillic alphabet used by eastern Slavs is a version of Greek devised by bishops Cyril and Methodius in the ninth century. To accommodate Slavic sounds that had no Greek counterpart the bishops adopted a few Hebrew characters or simply invented others.

Arabic script comes directly from the ancient Semitic script, but scribes through the centuries have so modified it that close ties are no longer apparent. With the spread of Mohammedanism, which forbids translation of the Koran, Arabic script embraced such diverse languages as Fula and Swahili in central and east Africa, Persian, Urdu (Pakistan), Malay, and (up to 1928) Turkish.

Other offshoots from the original Semitic include Armenian and the Devanagari ("pertaining to the city of the gods") of ancient India, used for Sanskrit, which gave rise to the numerous scripts of modern India, Burma, Thailand.

Instead of devising separate symbols for vowels, many southeast Asian scripts tacked them on to consonants, multiplying the number of letters to staggering proportions. Tamil, leading language of south India and of a considerable group in Ceylon, has 312 characters, other Indian languages have as many as 700.

Chinese preserves intact its ancient ideographic writing; with a helper alphabet it also serves the completely different Japanese. For the past century many Western scholars have urged the Chinese to convert their language to an alphabet, and in recent

years the Chinese Communists have studied the problem; they now apparently favor the use of Roman letters as auxiliaries for ideographs.

Although a study of the connection between language and learning is a modern phenomenon, some evidence suggests that the ancients were keenly aware of the important role of language. Thus, *hieroglyphic* in Egyptian meant "sacred stone writing"; writing was ascribed to Toth, god of wisdom, and called "speech of the gods." Mayas attributed writing to Itzamna, their most important deity; Japanese called their lost prehistoric script *kami no moji*, or "divine characters."

Vnriety. Mankind today speaks about three thousand different languages; linguists break down this vast number into five to nine main families.

Most widespread is Indo-European or Aryan, covering most of Europe, the Americas, Australia, and parts of Asia, includes Indic, Slavic, Germanic, and Romance languages. Peoples speaking Indo-European languages total nearly half the world's population. Oldest members of the family are Sanskrit, dating from 2000 B.C., Greek, from around 800 B.C., and Latin, which originated about 500 B.C.

Though a sixteenth-century Italian traveler noted the close relationship between his native tongue and Sanskrit, precise links were not detailed until three centuries later. Characteristic of the family is that words relating to immediate kin and other basic words are very similar in all the languages. Example: English "brother" is German *Bruder*, Latin *frater*, Greek *phrater*, Russian *brat*, Sanskrit *bhrátá*, Persian *birādar*.

Dutch, German, Danish, Norwegian, Swedish, Icelandic, and English belong to the Germanic (or Teutonic) linguistic group; English has a higher percentage of Latin words than any other member. Closest English relative among modern languages is Dutch, particularly the Frisian dialect spoken along the North Sea coast of both the Netherlands and Germany. The closest pre-English Anglo-Saxon language is Icelandic, which has changed very little since the Vikings first planted it on the bleak island.

No trace remains of the primitive Germanic tongue that preceded the present Teutonic group, but it may have existed as late as the

seventh century, probably split off from the parent Indo-European stem many centuries earlier.

Modern Romance languages all stem directly from the Latin of the Roman legions, include French, Spanish, Portuguese, Italian, and Rumanian, with such regional tongues as Catalan and Provençal. Most distinctive are Rumanian, which has incorporated many words from the neighboring Slavs, and Freoch, which preserves many Celtic words; Spanish absorbed many Arabic words during the centuries of Moslem occupation but remained close to Italian and Portuguese.

Slavic languages include Polish, Czech, Slovak, Slovenian, Serbo-Croat, Bulgarian, Ukrainian, and Russian, all so closely related that a speaker of one can understand a good deal of the others. Basic schism in the Slavic bloc is alphabetic: groups Christianized by Latin missionaries use the Roman alphabet, the rest use Cyrillic. Curious example of the alphabetic dichotomy exists in Yugoslavia, where the two largest groups (Serbs and Croats) speak practically the same tongue, yet write in different alphabets.

Other members of the Indo-European family include Greek, Albanian, Armeonian, each classed apart from others, as well as the vast Indic group, embracing Persian, Pushtu (Afghanistan), the many languages of Pakistan and northern India.

Less important numerically, but equal in historic importance, is the Semito-Hamitic family of North Africa and the Middle East. Most widespread Semitic tongue is Arabic, but the group also includes Hebrew, now revived as a language in Israel, the Berber tongues of North Africa, and the Ethiopian Kshitic languages.

Second largest family is the Sino-Tibetan, consisting of Chinese, Thai, Burmese, and Tibetan. Extending over considerable territory is the Altaic family, today represented by Turkish, Mongolian, and Tartar, often grouped together with Ural or the Finno-Ugric family, which embraces Finnish, Magyar (Hungarian), Estonian, Lappish.

Leading world languages, in terms of number of speakers are: Chinese (about 500 million), English (275 million), Russian (200 million), Hindi (160 million), Spanish (160 million). All these languages, except Hindi, are official languages of the United Nations, as is French, for centuries the main language of international diplomacy.

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Quality. Though scholars sometimes discuss the "richness" of one language or the "beauty" of another, the criteria for judging the quality of a language are extremely vague, are frequently highly subjective. In ancient times, the Romans tacitly acknowledged the superiority of Greek culture and science by absorbing both *in toto*, including the relevant terminology. In modern times other peoples have borrowed heavily from Italian for musical terms, from French in the fields of diplomacy and cuisine, from English for nautical and commercial terms. Before World War I, German ranked first as the language of medicine and science, with French second and English a poor third, since World War II, English is at or near the summit.

English is probably the richest of all languages in words—a total of about 500,000. One reason for this comparatively rich vocabulary may be the particular history of the language: the Celtic spoken by the original inhabitants of the British Isles was early overlaid with Latin left by Roman invaders, this hybrid tongue was then virtually supplanted by Anglo-Saxon, which in turn received many new words from the invading Danes, the Norman invaders added a heavy stock of Norman French. The resultant modern English is a multilinguistic mixture, rich in synonyms drawn from both linguistic centers of Europe.

Also enhancing the vastness of the English vocabulary is the complete lack of linguistic chauvinism. Unlike German and other tongues, English borrows freely from other languages, yet it will invent a native expression for any new object or idea, thus giving the language two or more new terms instead of one.

Language and Science. During the centuries preceding the Renaissance, medicine and science generally spoke one common language during a given historical epoch. Classic Greek succeeded earlier Semitic tongues, was in turn superseded by Latin, temporarily eclipsed by Arabic during most of the Middle Ages. During some two thousand years, physicians and other men of learning needed to know only one language to have practically the entire body of science at their finger tips.

Though references to medicine occur in the Sumerian Code of Hammurabi (ca. 1900 B.C.) and Egyptian papyri, the linguistic legacy of such early writings is virtually nil. Only a handful of

Egyptian and Semitic words appear in the works of Hippocrates (460-377 B.C.) and other Hellenic medical writers; they include such terms as *chlamys* (in *chlamydozoa*), from the Phoenician for cloak; *hyalos* (glass) and *pyramis* (pyramid) from the Egyptian.

The complexity of the classical Greek medical language indicates that it had a long pre-Hellenic history. But the near complete absence of non-Greek terms may mean either that the science had existed in Greece so long that its origins were lost, or that the translation was exceptionally good.

In Greece itself, the Aegean Islands, and at Alexandria, medicine flourished, drawing on the traditions and knowledge of Persian, Mesopotamian, and more distant lands when Alexander the Great extended Hellenic hegemony. For the entire Middle East during the centuries preceding Roman dominance, Greek was the single language of learning. Physicians and scholars, whether Egyptian, Persian, Babylonian, studied Greek, discussed any discoveries or additions in that language.

Long after Roman legions had overrun the entire Mediterranean basin, Greek remained the medium of medicine and science. Roman patricians prided themselves on a knowledge of Greek, sought Greek tutors for their offspring.

Most Roman physicians were trained at Athens, Alexandria, or Pergamum, and they appropriated the medicine and language of Greece. The straggly remnants of earlier Latin terminology consist almost entirely of such earthy terms as penis, testis, anus, vagina.

The popular usage of Greek terms sometimes led to medical confusion: Greek soldiers used dice made from the second cervical vertebra of a sheep, or *astragalos*; Romans made dice (*taxillus*, later *talus*) from horse's heel bones. Both terms came to apply, as now, to heel bones.

Romans changed Greek endings and spelling to conform to their own customs, but retained their Greek flavor. The Greek *k* generally became the Roman *c*; example: *perikardion* became *pericardium*. The Greek *-os* and *-ion* endings usually became *-us* and *-ium*. But some Roman pedants insisted on Greek endings for Greek words; words like *dermic* and *dermal*, *thermic* and *thermal*

existed side by side with both Greek and Latin endings, still plague scientific writers.

Most confusing for later practitioners was the Roman habit of using Latin nouns for anatomic structures, Greek terms for pathologic processes affecting such structures. Kidney disease became nephritis, rather than *renitis* (from *ren*); ophthalmitis was substituted for oculitis.

Less obviously of Hellenic origin were hundreds of anatomic terms translated literally from Greek; the Greek *peronaeos* (breast pin) became the Latin *fibula*, with the same literal and anatomic meaning.

With the fall of the Roman Empire, Greek continued to flourish in the Byzantine Empire, but it became a forgotten language in the West. For a thousand years churchmen retained almost complete control of medicine and its Latin classics, but preserved only fragments of Greek masterpieces.

Before the Moslem empire in Europe collapsed in the thirteenth century, much of Arabic learning, as well as the works of Hippocrates, Galen, and others, had passed to western Europe. Many modern terms of apparent Arabic origin betray Greek ancestry: both *alchemy* and *chemistry* probably came originally from the Greek *chymos*, the root of chyme; *alembic* came from the Greek *amblix*; *elixir* from *xerion*, meaning a dusting powder.

Ignorance of Arabic by some early translators produced such oddities as the cephalic and basilic veins, both from Arabic *kifal* and *basilik*, meaning inner and outer. Terms such as Adam's apple and *dura mater* are literal translations of fanciful Arabic names.

By the end of the sixth century, the various Latin dialects of Gaul, Spain, and other lands were no longer mutually intelligible, though Church and scientific Latin changed less rapidly. The Renaissance brought a revival of interest in classic Greek and Latin, and the realization that churchmen had considerably diluted Latin with loans from the vernacular. Paradoxically, at the very time scholars turned to ancient classics for inspiration and guidance, many also began to write in their native tongue. The Royal Society, founded in 1662, used English from the beginning; about thirty years later the Paris *Académie des Sciences* changed from Latin to French.

One aspect of the change from Latin to the vernacular was the struggle between physicians and surgeons. The latter usually knew no Latin, frequently berated physicians for hiding the "mysteries of the Art" in a language "commonly reserved for all that is sacred."

For physicians and scientists writing in the vernacular, classical Latin and Greek became the source of a host of terms to fit the flood of new findings and ideas following the Renaissance.

Greek early became the main source for medical neologisms. Words such as *analysis* and *epitome* remained unchanged, though such terms often received radically new meanings. Typical is *anthrax* (coal), which Hippocrates applied to carbuncle; it later came to mean epidemic exanthema (probably smallpox); similarly, both *melancholy* and *cholera* come directly from humoral pathology, now have no relation to *chole* (bile).

Some terms, such as *schema* and *therapeia*, received new endings, often were little changed in meaning. The largest group of Greek words are in a class with telephone, thermometer, hygroscopic: i.e., compounds that have no counterparts in ancient Greek because they represent objects and concepts unknown in classic times.

Lamented by linguistic purists are numerous words combining Latin affixes with Greek roots and *vice versa* (e.g., appendicitis, bactericidal). During past centuries many philologists and physicians have proposed to eliminate such hybrids, but few now see any such possibility. The tradition for the practice goes back to Roman times, was long ago extended to combinations of Latin and Greek with Teutonic elements.

English, French, Spanish, and other western European physicians usually understand one another's medical terminology, despite differences in the linguistic matrix. A notable exception is German, which often translates classical terms or preserves old Teutonic names. In modern times Germans have made systematic attempts to uproot classical and neoclassical terms, as have the Russians.

Medical English contains up to 75 per cent Greek; much of the remainder comes from Latin, with less than 5 per cent surviving from Anglo-Saxon or other early sources.

Anglo-Saxon remnants account for simpler terms for the parts of the body (arm, hand, foot, knee, bosom), but many words such as milt (spleen; German *Milz*), snaffle (mouth) continue only in veterinary or colloquial use.

Inspired by the Renaissance, Elizabethan scholars tried to restore many vulgarized Latin terms to classic purity, with indifferent success. *Henry* and *palsy* have practically disappeared, but firmly entrenched are other corruptions such as fancy, frenzy, rickets (from *rachitis*).

By the end of the nineteenth century, the flood of new words entering Western languages became a torrent: a recent list of some four thousand dated scientific terms identifies nearly one thousand as of nineteenth-century origin.

During the present century the tide shows no sign of ebbing, and physicians must contend with countless classical-sounding trade names, often used interchangeably with generic terms. One suggestion is that various specialties should standardize terms so that other specialists may follow; also proposed is a simplification of the general terminology by weeding out synonyms. Many fear that, if recent trends continue, verbal chaos may engulf scientific communication.

Equally troublesome is the lack of international uniformity, despite the large common fund of Greco-Latin words. Pediatrics, psychiatry, and other specialties have made progress toward standardizing national terminology, little toward a workable international nomenclature.

With improved transport and communication of recent decades, many physicians and scientists note that internationalization of scientific terminology is only a small step toward universal scientific communication: still remaining are linguistic barriers that no standardization can eliminate.

Solutions. Almost as soon as Latin disappeared as the international language of scholars, many enthusiasts came forward with suggested replacements. Among the earliest was mathematician-philosopher René Descartes who proposed in 1629 a system of universally intelligible symbols, similar to Arabic numerals or Chinese ideographs. Forty years later Bishop Wilkins offered a similar set of symbols. In 1657, Cave Beck manufactured a

system combining Arabic letters and Arabic numerals, which in one example read: leh2314 p2477 pf2477, pronounced *lebentor-confo peetososensen pistofosensen* and meaning "honor thy father and thy mother."

In all, about 500 such artificial international languages have appeared in the past three centuries, some quite ingenious, others little more than copies of other languages, living or artificial.

At least three attained a measure of success: first was *Volapük*, devised by German Monsignor Schleyer about 1880, using mainly Romance-English roots, with essentially German grammar. Within nine years after its appearance, *Volapük* had some 200,000 supporters, two dozen publications, but the movement fell apart when some followers disputed the basic character of Indo-European languages, while others flocked to the rival *Esperanto*.

The inventor of *Esperanto* was Polish-Jewish physician Ludwig Lazarus Zamenhof (1859-1917), who learned about language difficulties in his native Bialystok (then in Russia). The language appeared in 1887, gained a considerable following in Russia, although Czarist officials suppressed their organ *La Esperantisto* because it printed an article by pacifist Leo Tolstoy.

During the interwar years, *Esperanto* rode a crest of pacifist sympathy, had about four thousand publications, and was taught in schools in Albania, China, Germany, Spain, Portugal. The basic vocabulary is a mixture of Romance, Slavic, and Germanic roots; its apparent complexity led a group of dissenting *Esperantists* to devise *Ido*, using predominantly Latin roots.

Perhaps the most popular of international tongues at present is *Interlingua*, based wholly on Latin roots; it dates from 1908 when mathematician Giuseppe Peano began a paper before the *Accademia delle Scienze di Torino* in Latin, finished it in Peanese.

Most *Interlinguists* apparently claim only a limited internationality for their tongue, stressing its usefulness to those who speak a language based on Latin or who have at least some indirect acquaintance with it. Followers among physicians and scientists apparently are considerable; *Blood, Circulation, The Journal of Dental Medicine*, and others publish *Interlingua* summaries; in 1954 the World Congress of Cardiology included *Interlingua* summaries of papers in its program.

Of recent vintage is *Suma*, a one thousand-word "universal language" devised by Dr. Barnett Russell, Gardena (Cal.) physician. This does not derive words from other languages but invents its own vocabulary of short, easily spoken words. Example: *ma te tale*, I am a doctor.

At least a partial solution to the problem of language differences at international medical conferences is the use of simultaneous translation, similar to the United Nations system. Major drawbacks: cost and practical limitation of the number of languages that can be handled.

Modern Trends. Among the most promising and spectacular approaches to language barriers in the written word is translation by machine. Designed since World War II, translating machines are essentially electronic "brains" that "memorize" a selected vocabulary, select the proper term for each foreign word fed to them. Result so far is overly literal translation requiring considerable editing and polishing by an expert in both languages.

Valuable medical dividend from current experiments with translating machines may be an improved understanding of the working of the brain and the problem of communication within organisms. Basic view of mathematician Norbert Weiner, author of *Cybernetics*, or *Control and Communication in the Animal and the Machine* (1948), is that "any organism is held together by the possession of means for the acquisition, use, retention, and transmission of information." By extension, physical or mental malfunction in organisms may at base be nothing more than failure of the organism's communications system.

Words and Science. The marriage of words and science has until now been a fairly happy one, though the future is by no means predictable.

During the momentous era of the development of electricity, words played an important role in clarifying concepts and pointing the way to progress. Example: in the early days of electricity one behavior of electrical conductors was expressed as the "reciprocal of resistance," until some unknown genius drafted the word *conductivity*. Thereupon the single concept of conductivity became the object of special study, leading to enormous strides in electrical science.

Modern electronic science has also coined new words, but the complexity of its equations has in general made it simpler to use symbols. Words have to be reduced to such symbols before they can be processed in electronic "*brains*." Words, by making science possible, thus appear to have talked themselves out of existence.

Another oddity is that modern sciences have in many instances returned to the ancient art of pictograms. Examples: in biochemistry the carbon ring is shown thus O, while in electricity—□—becomes an oil circuit-breaker. Interesting speculation: will these scientific pictograms in time become an entirely new alphabet, with its own "*grammatic*" system?

If this happens, words and science will probably reach the parting of their ways. Words will then assumedly be reserved to express the intangible and spiritual elements in human communication (emotion, mysticism, poetry), symbols will become the language of science and everyday living.

Thus words and science have for many centuries worked together to nurture the growth of human knowledge.

Teller of Tales (*W. Somerset Maugham*)



Born in France, descended from a line of British lawyers, raised by a clergyman, and trained as a physician, he became one of the century's most successful writers. In a spacious Riviera villa, when most men of his age would be content to bask in the sun, Dr. William Somerset Maugham still writes for at least three hours daily as he has done for more than sixty years, although he officially "retired" nearly a decade ago.

The venerable writer apparently believes in the maxim of one of his favorite authors, Spain's Fray Luis de León, who wrote: "The secret of life is nothing but this, that each should act in conformity with his nature and his business." By nature methodical, Dr. Maugham's business is to write.

The Present. At his 85th birthday, the writer looks younger than his years. Spry and hardy, he travels for about three months each year, spends another three months in London and the rest of the year at the Villa Mauresque, perched atop Cap Ferrat, not far from Nice. He arises near dawn, strolls under the pines, orange trees, mimosas, and pink laurels in his garden, breakfasts leisurely, then settles in his top floor studio for his daily writing stint. His present book (which he vows will be his last) is a collection of essays on the short story and on the early novels of Goethe. To

supreme Robert Louis Stevenson's *Tusitala*, the born "teller of tales." His work extends over more than a half century; he has been successful in every literary form he attempted: novel, short story, stage or screen play. To date he has produced 20 novels, 25 plays, 105 short stories, 9 non-fiction works. Sales top five million copies in United States alone.

For themes he draws heavily on his own experiences as medical student and intern, secret agent, roving observer, spinning a plausible yarn from incidents or impressions recounted by others. There are no morals or lessons in his stories, and he repeatedly disclaims any "pedagogic instinct." Accusations of cynicism leave him unmoved. Wrote he: "All I have done is to bring into prominence certain traits that many writers shut their eyes to. . . . I have known crooks who were capable of self-sacrifice, sneak thieves who were sweet-natured and harlots for whom it was a point of honor to give good value for money."

His aims are "lucidity, simplicity and euphony." Early works contrast sharply with the glittering alliterations and pompous verbosity popular in Edwardian days. Later critics have attacked his sparse, lean style as colorless and commonplace, though most agree that his tales move swiftly and logically.

Some attribute his success to sheer doggedness: once he formed a formula acceptable to a substantial part of the reading public he never abandoned it. Others give credit to his simplicity and directness coupled with the ability to lay bare the substrata of elemental passions and emotions common to mankind.

On the occasion of his 84th birthday, Maugham declared that he had made two resolutions. The first was never to write another book. *Catalina*, set in Spain, would be his last novel; *Creatures of Circumstance*, his last book of short stories; the collection of literary and philosophic essays (then in process) would be the last book.

The second was never to eat in a restaurant of any sort, confining himself either to meals at home or in a hotel room.

The Clinician. Though he never practiced medicine, the lessons learned at St. Thomas' profoundly affected all his works. Wrote he: "I . . . witnessed pretty well every emotion of which man is capable. . . . I saw how men died. I saw how they bore

pain. I saw what hope looked like, fear and relief; I saw the dark lines that despair drew on the face." Later experiences only confirmed the basic analysis of human nature he made on the wards and in the outpatient department at St. Thomas'. To every writer he recommends a thorough knowledge of physiology and psychology; he should "know how the basic elements of literature are related to the minds and bodies of men."

What many regard as cynicism could be called "clinicalism," the result of training in the scientific method, which enabled him to dissect human emotions and actions with the dispassionate objectivity of a pathologist.

Physicians figure prominently in nearly all his novels, many of his plays and short stories. The portraits are sometimes unflattering but always credible. The most interesting is Dr. South in *Of Human Bondage*: ignorant of the latest techniques, he makes up for his shortcomings with kindness and a shrewd insight into human nature. Another notable physician is opium-smoking Dr. Saunders in *The Narrow Corner*; though skilled in ophthalmology, he is perhaps more notable for his philosophy of accepting people as they are, trying neither to reform nor re-educate them: Maugham's own attitude.

One recurrent Maugham idea is frequently found in fledgling clinicians as they dissect cadavers: wonder and awe at the meaning of life. Though not religious in the conventional sense, Maugham has long speculated on the ultimate destiny of man, frequently dreamed of the City of God; in many of his works appears a secondary figure absorbed in these speculations.

He still ponders on the mystery of life, but now he seems resigned to the end of his quest. Said he recently: "I am like a passenger waiting for his ship at a wartime port. I do not know on which day it will sail, but I am ready to embark at a moment's notice."

Houris and Medicine



Familiar to most physicians are their childhood storybooks recounting the wonderous adventures of Sinbad, Ali Baba and the forty thieves, Aladdin and his magic lamp, tales from the *Arabian Nights*; not so familiar is the abundance of medical lore found in these tales, which afford sidelights on Arabic medicine.

The Stories. Scholars know almost nothing about the origin of the scores of tales in the *Arabian Nights*, surmise that many began as tall tales told by early Arabian camel drivers huddled around the evening camp fire. Experts date their present form from the eighth to the sixteenth century, the golden age of the Islamic Empire and the most brilliant era of Arabic medicine and science.

The framework of the fantastic adventures is the tale of Scherherazade (or Sherherazade) who kept her husband, Sultan Schariar, from killing her by entertaining him for 1001 nights with the string of tales.

The first European version of the tales was *Les Mille et Une Nuits*, translated by the French archeologist-orientalist Antoine Galland and published during 1704-17. Hacks hastily translated from French to other languages; pirated editions of the first Galland volumes soon appeared in the Netherlands and England. The

first English version was by an unknown translator (sometimes called "the Grub Street translator"). The title began with the words *Arabian Nights*, now probably the best known name for the stories.

There is no standard version of the *Nights*, either in the original Arabic or in translation; the collection has always been fluid, consisting of different stories at different times.

The best known English work is the unexpurgated sixteen-volume version of Sir Richard Francis Burton (1885), laced with lengthy and often vivid anatomic and clinical footnotes, considered by many to be equal to the *Nights* themselves in entertainment value. Outstanding among translations to other languages is the comparatively recent (1928) German version by Enno Littmann which contains a highly regarded study covering the translation, origin, and contents of the *Nights*.

Most popular French version, published in 1899, is that of physiciao-orientalist Joseph Charles-Victor Mardrus (1868-1949). Though considered inaccurate by some authorities, it has been translated to many other languages, including a Spanish translation by the noted novelist Vicente Blasco Ibáñez.

Anatomy and Physiology. Richest lode of anatomico-physiologic lore is the tale of Abu al-Husn and his slave girl Tawaddud, who boasted a navel that would hold "an ounce of benzoin," and "hind parts heavier than two hills of sand," plus a remarkable erudition. When profligate master Abu al-Husn squandered his patrimony on wine, women, and song, she suggested that he recoup his fortune by selling her to Caliph Harun al-Rashid. Once in the presence of the Caliph, Tawaddud discourses at length on poetry, medicine, jurisprudence, other arts and sciences, answering questions put by a bevy of learned men.

Man, she told the questioning physician, has 249 bones, 260 veins, and three "souls or spirits—animal, rational, and natural"; furthermore, said she, "Allah made him a heart and spleen and lungs, and six intestines and a liver and two kidneys and buttocks and brain and bones and skin and five senses."

The heart "be set on the left side of the breast and made the stomach the guide and governor thereof. He appointed the lungs for a fan to the heart and established the liver on the right side

opposite thereto. He made, besides this, the diaphragm and the viscera, and set up the bones of the breast and latticed them with the ribs."

In subsequent answers she closely follows Talmudic anatomy; Galenic physiology in discussion of functions.

Physicians. Frequently scorned and ridiculed, sometimes regarded with esteem, many types of physicians appear throughout the stories. Most are Arabian or Persian, but many are Jewish, the latter catering mostly to the poor. One Persian physician boasts: "I practice without the ordinary accoutrement of astrologers and sages. I do not enlarge my turban or increase the number of its folds, I do not prolong my sleeves, I do not carry a great weight of hooks under my arm, I do not stain my lids with black kohl, I do not carry around my neck a chaplet of a thousand beads; I cure without mysterious mutterings, I do not blow in my patients' faces or bite the lobes of their ears."

On another occasion the physician is advised to examine the patient "just as though his illness were something entirely unknown, then assume a sad and thoughtful air to impress those around."

As in most societies, the physician could enter where others could not. In the story of "how the Prince of Persia let his heard grow and putting on the bahit of a physician passed for a leech," the Prince easily gains access to the royal apartments where his true love lies. When the devil wished to visit Ahu Ishaq Ibrahim al-Mosuli, he put on the long white cloak and shirt and high turban favored by physicians, sprinkled himself liberally with perfume, took a silver-headed stick in his hand, and strode into the palace with no questions asked.

Though usually well paid, the price of the physician's failure was sometimes high by modern standards. When Princess Budur went mad, her father King Ghayur offered his daughter in marriage with half of his kingdom to anyone who could cure her, "but whoso cometh to her and cureth her not, I will strike off his head and hang it over the palace gate." He chopped up some forty physicians (plus the same number of astrologers) before the daughter was finally cured.

One of the most accomplished physicians of the *Nights* was the

female practitioner Shaykhah Rajihah "to whom they present whoso hath any ailment and he passeth a single night in her house and awaketh on the morrow whole and ailing nothing." Details concerning her intriguing and "effective" methods and procedures are lacking.

Although the Arahs are credited with originating the modern practice of pharmacy, few pharmacists appear in the tales; generally the "pharmacist" was a physician dispensing on the side or an itinerant drug peddler. In the "story of Ni'amah bin al-Rahi'a and Naomi his slave girl," a Persian physician came to Damascus, rented a shop, adorned the shelves with "vessels of costly porcelain, with covers of silver, and with gildings and stuffs of price . . . set before himself vases and flagons of glass full of all manner of ointments and syrups, and he surrounded them with cups of crystals and placing an astrolabe and geomantic tablet facing him, he donned a physician's habit and took his place in the shop."

Surgery. Arahs apparently were the first to make surgery a sideline for harbers, as in the *Nights* most simple surgery was referred to harbers. A schoolmaster who hadly burned his mouth while eating a hot egg had a harber lance the resultant abscess, was left with a mouth "split and deformed"

Though there are countless tales of the use of hashish for its narcotizing effects, most harbers apparently operated much of the time with simpler anesthetics or none at all. Example: in the case of a young man who was mentally ill, the physician advised that "nothing will cure him and bring him back into the way of sanity except the extraction of his two great molars and a good cauterization on each temple with the fly cantharides or a hot iron."

As the young man enters the barber's shop, the harber trips him up, two assistants then pinion him to the floor. At that point: "the master barber at once thrust down his throat an instrument like a blacksmith's tongs, which he used for taming recalcitrant teeth, and with a single jerk of his arms, pulled out the two molars. Then, in spite of the yells and twistings of his victim, he took up two red-hot nails in a pair of pincers and liberally cauterized the . . . temples, calling on Allah the while."

Nearly all barbers carried a few medicines among their lancets and razors. In one of the tales, a barber confesses: "You do not

know that all barbers are not like me. You only sent for a barber. But here in my person you have the best barber in Baghdad, an experienced physician, a very profound chemist, an infallible astrologer, a finished grammarian, a complete orator, a subtle logician, and mathematician perfectly versed in geometry, arithmetic, astrology and all the refinements of algebra: an historian fully master of the histories of the universe. Besides I know all parts of philosophy. I have all our law at my finger ends. I am a poet: I am an architect. What is there that I am not? There is nothing in Nature that is hidden from me."

Since mutilations were common punishment even for minor crimes, surgeons had to be highly skilled in amputations and the use of hemostats. In the "Story of the Jewish Doctor," boiling oil is used to cauterize the stump after amputation of the hand as punishment for stealing. In other instances, "powders of healing herbs" are used to stanch the flow of blood. Salt apparently was considered both hemostatic and prophylactic; it was used in amputations and wounds to halt bleeding and to prevent "corruption" of the blood.

Although from other accounts Arabs frowned on castration and obtained most of their harem eunuchs from the Byzantines, tales of total or partial castration abound in the *Nights*. Total amputation of the genitals was a preferred punishment for cuckoldry, but knowing brides often cleverly concealed past errors by sprinkling the blood of a pigeon-poult on their shifts before retiring to the bridal bed.

Psychiatry. The Arabic approach to psychic disorders was direct and brutal. Example: "When the people heard his words, they said: 'This man hath become mad.' And not doubting his insanity, they came in and laid hold upon him, bound his hands behind him, and conveyed him to the madhouse. There every day they punished him, dosing him with abominable medicines and flogging him with whips, making him a madman in spite of himself. Thus he continued, stripped of his clothing, and chained to a high window by his neck, for the space of ten days."

Similarly, when King Ghayur noted that his lovesick daughter "cast her eyes right and left and rent her raiment even to the skirt," he decided that she was insane and "bade the woman lay

hands on her; so they seized her and manacled her, then putting a chain of iron about her neck, made her fast to one of the palace-windows and there left her."

Flogging with the penis of a hull and burning with hot irons are frequently mentioned as treatment for the insane or allegedly insane.

Typical of the Arabic approach to minor mental ailments is the advice given to Giafar by a Damascus physician who diagnosed love-sickness:

"In the name of Allah, the supreme doctor, take three measures of her pure presence into which has been stirred a grain of prudence, three measures of union clarified with a pinch of absence, two weights of clear affection studiously free from wormwood, a heaped measure of incense of kisses high and low, a hundred kisses of the pomegranates, of which fifty shall be lip-sweetened, thirty pigeon fashion, and twenty after the manner of little birds, two measures of Aleppo subtlety and sighs of Irak, two ounces of tongue ends worked diligently in and out, three drachms of right Egyptian and pure white fat, boiled in love water and syrup of desire over the fire of pleasure: pour the mixture into a soft couch and quickly add two ounces of the water of her mouth. Take fasting for three days; on the fourth at noon eat a slice of melon of desire, flavoured with lemon and white almond milk to taste, and wash down with three measures of good thigh work. Then enter the bath swiftly and deeply, for the health's sake. And may it be a cure to you!"

Diagnosis. With scant knowledge of gross anatomy and physiology other than that inherited from Hippocrates (c. 325 B.C.) and Galen (c. A.D. 129-200), the Arabs were surprisingly adept diagnosticians and clinicians. In her recitation of medical knowledge, the slave girl Tawaddud cites the importance of the four humors of Hippocrates and the effects of planetary conjunctions on prognosis.

The signs of disease, according to Tawaddud, were both external and internal. Illness could be diagnosed from the pulse, degree of dryness, temperature, stiffness; yellow eyes betrayed liver disease; hunched shoulders indicated inflamed lungs. The

best diagnostic signs for most internal ailments: vomitus, the nature and site of pain, edema, excreta, and urine. One prosperous Damascus physician easily diagnosed all manner of ailments by peering through specimens of urine.

A suggestion that the Arabs understood allergy is found in the tale of a girl who visits a spinning shop, accidentally snags a bit of linen thread under a finger nail, and immediately falls unconscious. Happily a prince happens by, takes the prostrate girl's hand to kiss it and so doing dislodges the offending allergen. The girl springs back to life and marries the prince.

Drugs. Most references to drugs in the *Nights* are to the use of hashish; often it is used simply for its hallucinatory effect, but just as frequently it is a path to amorous adventures, either by eliminating possible objectors or by rendering a reluctant partner more compliant. A trifling wife drops a bit of *bhang* (henbane or possibly hashish) into her husband's cup so "he sleepeth and wotteth not whither she goeth nor what she doeth."

The pleasant effects of hashish are extolled in various tales; in the "Tale of Kazi and the Bhang-Eater," the narrator asserts that the "drug when swallowed by man garreth him prattle of whatso he pleaseth and chooseth, making him now a Sultan, now a wazir [vizier] . . . the while it seemeth to him that the World is in the hollow of his hand." In the "The Tale of the Hashish Eater," the story describes how fumes mounted to a man's brain, bringing dreams involving bathing, priapic exploits, delusions of grandeur.

Repeatedly mentioned in the many erotic adventures are aphrodisiacs and anaphrodisiacs, although details concerning their composition are few. One recipe calls for two ounces of Roumi opium, equal parts of Chinese cubeb, cinnamon, cloves, cardamoms, ginger, white pepper, and mountain skink. These were pounded together, boiled in sweet olive oil, after which three ounces of male frankincense were added, plus a cupful of coriander seeds. Prepared saffron is prized as an aphrodisiac for women: two ounces of hops and a few hemlock leaves simmered in one ounce of virgin vinegar.

Poisons employed in the *Nights* include a depilatory composed

of yellow arsenic and quicklime, and snake venom. However, most references to poisoning give no hint of the agent used.

Summing Up. Scherherazade's amusing tales offer the physician insights into the imposing contributions of ancient Arahian medicine.

Now recognized by most medical historians is the fact that the Arahians exerted important influence on the progress of medicine from the eighth through the thirteenth centuries, at a time when European medicine generally stagnated.

The Arahns translated Greek medical texts, preserved ancient medical traditions, passed them on to Renaissance Europe together with a number of solid contributions of their own.

Most notable were advances in medical chemistry. Credited with the introduction of the modern practice of pharmacy, Mohammedan medical men discovered a vast number of drugs, including alcohol, sulphuric and nitric acids, silver nitrate, mercury bichloride, benzoin, camphor. They may have been the first to use narcotics and the soporific sponge as anesthetics, also introduced medicated syrups and fruit extracts to Europe.

In all parts of the Islamic Empire the Arahns built magnificent hospitals, included separate wards for men and women and for patients with different types of disease, set up special hospitals for eye diseases, may have originated our modern hospital system.

Arabian medical schools and libraries probably surpassed all others in their day; they preserved lay teaching and practice of medicine at a time when European medicine became a clerical monopoly.

Front-ranking clinicians for centuries, the Arahians were first to distinguish smallpox from measles and other exanthemata, first described glaucoma. In ophthalmology, Arahians were acknowledged leaders for centuries, first described pannus and the operation for the relief of the chronic form, also operated for cataracts.

Famous Arahian physicians of the period included: Rhazes (c. 860-932), noted for his early description of smallpox; Avicenna (980-1037), author of the *Canon (Q'anun)*, which was translated into Latin, used as a text in European medical schools

for centuries, Alhucassis (936-1013), authority on surgery, one of the earliest to urge the study of anatomy, Avenzoar (c 1094-1162), most celebrated clinician of the Western Caliphate, Maimonides (1135-1204), often credited with the famed *Physician's Prayer*

Ugly Duckling Genius (*Hans Christian Andersen*)



My life is a fairy tale.

—Hans Christian Andersen

Once upon a time there lived a cobbler's son who wrote fairy tales for children (and grownups too), which were once said to have done almost as much as the New Testament to preach the gospel of love on earth. Here is the bittersweet story of Denmark's Hans Christian Andersen, immortal prince of fantasy.

The Life. The tales were deeply rooted in the provincial town of Odense, where he was born in 1805. His parents were young and poor; their home was a single room and kitchen; Hans slept in a bed that had once been a frame for a nobleman's coffin.

Wrote Andersen autobiographically: "[My father] was a wonderfully gifted man with a truly poetical nature . . . I had all his love; he lived for me." Inexpert at his trade, saddened because of his lack of learning, the cobbler spent all his free time playing the flute, fashioning puppets and pictures for his son, reading aloud from the plays of Ludvig Holberg (the Danish Molière), the *Tales of a Thousand and One Nights*, and Shakespeare.

From his father, Hans inherited his shock of whitish-blond hair and his acutely sensitive nervous system; from his mother, his extreme height and his simplicity of nature. Anne-Marie Andersen was a washerwoman, addicted to brandy to ease the chill in her

bones. Unlettered and superstitious, she raised her son on a diet of gruesome stories of ghosts and witches, evil demons, accidents, and violent death.

The strange boy grew to be tall, gawky and awkward; he had a large nose, outsized hands and feet, small eyes hidden under protuberant brows. His mother dressed him in his father's cast-off clothes in a manner that exaggerated his already somewhat grotesque appearance, and Hans soon learned to avoid the gibes of the other children by playing alone. He loved to design and sew clothes for his dolls and put on plays in the puppet theatre his father built. A single visit to the local theatre had left him stage-struck; he collected playbills and from the titles and casts of characters he imagined whole plays.

He feared his grandfather, a harmless lunatic, hid in shame and terror when street urchins taunted the old man. Wrote Andersen later: "I knew that I was of his flesh and blood." This dread of the familial insanity haunted him all his life.

An early memory was of being taken to dinner at the Odense jail (the janitor was a family friend), an experience so frightening that he could not eat. Another traumatic visit was to the insane asylum where his grandmother worked. A naked woman sitting on a pile of straw and singing in a "pretty voice" suddenly rushed screaming at the boy and touched his clothes "When the sweeper came I was half dead. That vision and the impression of the whole incident has never been deleted from my mind."

Schooling was intermittent: he fled in fright from his first class when the school teacher rapped his knuckles, had to leave another school at the age of eight when his father died. Later he attended the city school for poor boys, but he was no scholar; he preferred to sing in his soprano voice, play with his dolls (until he was sixteen), recite his childish poems and plays to anyone who would listen, and dream of the day when he would be famous.

Attempts to put the boy to work in factories failed; the men were too coarse and brutal for him. He spent a few days in a textile mill singing and dancing for the employees, until they began to speculate on his sex. "They held my arms and legs, I bawled at the top of my voice and, bashful as any girl, I rushed out of the

building and home to my mother who at once promised I never need go there again."

At fourteen, Hans was an odd combination of sbyness and effrontery: a feminized boy who cried easily and was afraid of the dark, yet with an unshakable faith in his talents as a singer, dancer, and actor. "I shall be famous," he told his mother, and he left for Copenhagen with 13 *rigsdaler* (about \$13) and a determination to seek his fortune in the Royal Theatre.

Bearing a letter to a famous dancer, Mme. Schall, the boy burst into her home and went into a wild dance, using his hat as a tambourine; he cut such a weird figure that she thought he was mad. Several days later, now penniless and hungry, Hans went to see Siboni, the singing master at the Royal Theatre. The boy sang and recited from Holberg, aroused such interest that Siboni took him on as a pupil, organized a collection to feed and bouse him.

Andersen's singing career ended nine months later when his voice changed, but his dream of theatrical glory persisted. He managed to get accepted in a ballet class for a time and made his debut in a small part as a woodland sprite; some said he looked more like a stork.

Finally accepting his limitations as a performer, the seventeen-year-old boy decided to become a playwright. His first efforts were two tragedies, which the Royal Theatre returned with the comment: "With the total absence of elementary culture and all knowledge, which this play shows on every page, it would be impossible even to the highest talents to produce anything which might deserve to be presented to a cultured audience." The theatre directors advised the ignorant dramatist to seek instruction in the elements of grammar, spelling, and other literary techniques.

But for friends, Hans would have starved. All his life he possessed a brashness that enabled him to meet important people, and a unique personal charm that inspired them to help him. An early benefactor who saw the glimmerings of talent behind the crude naive façade was Jonas Collin, one of the king's (Frederick VI) chief councilors; he arranged an allowance and free tuition at the Slagelse Latin School.

Hans Andersen thus went back to school with children half his age and size. He soon became the whipping boy for the sadistic

headmaster, who called him a lunatic, derided his poetic pretensions. Another burden was the lechery of the headmaster's wife, a notorious hawd who boasted that she had bedded with all the officers of the town regiment. The woman periodically visited Hans' room *en déshabillé*, a shocking experience for one destined to remain innocent of sex all his long life.

A backward and unwilling pupil, Hans finally fled to Copenhagen with the memory of the school as "the darkest dreams of my recollection." With the aid of private tutoring he passed his student examinations and was, at twenty-three, ready to challenge the world as a literary man. His friends maintained their faith in the eventual triumph of the pathetic, ambitious young man; they opened their houses to him, gave him money for his modest needs, listened patiently to interminable readings of his plays and poems.

Hans' daily visits to his tutor's home resulted in a book, a conglomeration of the sights, sounds, and thoughts that ran through his head as he walked across town. He brought it out at the expense of his friends, but when the public found it fresh and charming a publisher took it over. The critics were kind and Hans Christian Andersen was launched at last on a career.

He loved Italy, the "warm country," and his Italian tour of 1833 provided him with material for his first novel. *The Improvisatore* (1835) was largely autobiographic and his first real success, the turning point in his life. Wrote he: "It raised my fallen house, rallied my friends and won me new ones."

The same year his first volume of fairy tales appeared, written in the hope of making a little money while waiting for royalties from the novel. Three (*The Tinder Box*, *Big Claus and Little Claus*, *The Princess and the Pea*) were reworkings of folk tales he had heard as a child, the fourth (*Little Ida's Flowers*) he created from his own experience.

They were "trifles," Andersen felt; but they spread over Denmark, then to Germany, Sweden, England, eventually all over the world. They became more than a fashion, were found on grownups' bookshelves as well as in the nursery. Suddenly the cobbler's son was a celebrity, and children stopped him on the street to say how much they liked his stories.

The rest of the first volume (*Thumbelina*, *The Naughty Boy*,

The Traveling Companion) was published the next year and Hans Andersen's position as a unique teller of tales was solidly established; as more tales appeared, every year or two, his fame grew and spread. Said a friend: "*The Improvisatore* made you famous; these [stories] will make you immortal."

Hans Christian Andersen could not quite believe his trifles were as wonderful as all that; he felt that his real talents lay in more adult fields. He wrote several novels, volumes of poetry, travel books, plays, and an opera (still being performed). Some were well received, some were condemned unmercifully by the critics, which invariably threw him into paroxysms of grief. The novels and plays have faded into limbo; some of the poems are still found in anthologies; the fairy tales remain.

He wrote 168 of his stories for children (the last in 1872); the best of them were written between his thirtieth and fortieth years. Andersen, now wealthy and hailed as a genius, basked in the plaudits of the world. More self-assured, less crude and raw, something of a dandy in his dress, he dined in state with the royal families of Europe, toured in triumph, hobnobbed with Balzac, Dumas, Hugo, Dickens.

Here is his own description of a meeting with Dickens: "Dickens entered, youthful and handsome, with a wise and kind expression and long beautiful hair. . . . We pressed one another by the hand, gazed into one another's eyes, spoke together, and understood one another. . . . I was deeply moved and happy by seeing and speaking to the one man among the living writers of England whom I loved most. . . ."

His fame and reputation increased with the years and his name became a household word, the most popular in literary history. In 1867, he journeyed to Odense for a celebration in appreciation of its most illustrious son. There was a ceremony and banquet, the day was declared a public holiday, the whole town was illuminated in his honor. The fortune teller's prophesy had been fulfilled. On August 4, 1875, while visiting friends at a country estate, the beloved storyteller died quietly in his sleep.

The Man. The theme of isolation, of being different constantly creeps into Andersen's work, and with reason. Clara Schumann

called him the ugliest man alive, a noted Danish sculptor remarked on the strange shape of his head

In the opinion of Dr Leo M Davidoff and others, the long arms, enlarged hands and feet, prognathism, and prominent orbital ridges raise the suspicion of acromegaly. Notes Dr Davidoff 'I would say that the high soprano voice up to the age of fifteen, and his failure to shave up to the age of twenty three, would indicate that a pituitary disturbance existed prior to the development of the particular change in this gland that gave rise to his eventual acromegalic appearance

Some biographers say Andersen's physiognomy weathered into a kind of noble dignity in later life, others insist the improvement was the result of greater attention to his dress, hair (he had it curled regularly), and general appearance

One biographer reported that Andersen was a weak, sickly child. He had fits, which they took for epilepsy, but which seemed to have been hysterical convulsions due to the drain his too-vivid imagination made on his nerves with their inherited weakness

He suffered from toothache all his life, complained of a variety of illnesses, in later life he developed a full blown hypochondria. His journal is full of references to coagulated blood, rheumatism of the nose, buzzing in the jugular veins. He feared that he might have swallowed glass, taken poison instead of medicine, contracted glanders from a horse's spittle. Wrote he 'The mosquitoes bit me, I may get apoplexy. Again 'I am thinking of becoming lame or apoplectic'

His journal verifies his fear of insanity, his suicidal thoughts, his desire for medical help. 'I ought to talk to a doctor—one who could enlighten my sick mind.' He was plagued by nightmares in which his throat and mouth were filled with hair.

Using Andersen's autobiography as the chief diagnostic source, German psychologist M. Tramer wrote: 'Hereditarily tainted by schizophrenia on his father's side. In his character there are schizothymic and cyclothymic components, as well as feminine traits. An endogenously and exogenously determined character, infantilism eventuated. Due to his great though slowly developing creative powers and the strong syntonic side of his temperament he developed into an only partially neurotic person.' A kinder

interpretation is that his supposedly manic-depressive moods were no more than a poet's natural swings between despair and ecstasy.

In his journal Andersen often confesses his femininity. "[Jonas Collin] set himself against that which amounted almost to girlishness in me." Unlike the swans that he so admired (the bird that woos ardently and mates for life), Andersen's love affairs were cbaste, essentially as unreal as his fables. Wrote he: "Give me a hride; my blood needs love as my heart needs it!" But although he professed to have fallen in love with several women, usually the daughters of friends, he always retreated, with a combination of sadness and relief, before pursuing the matter too far; he rationalized his failures by complaining of lack of money to support a wife. The woman who attracted him most was the "Swedish Nightingale" Jenny Lind. Andersen once proposed to her by letter, which she declined to answer; he contented himself with writing *The Emperor's Nightingale* in her honor.

Consensus was that the writer led a completely ascetic life. In his autobiography he refers to his erotic imaginings while in Paris: "Much inclined to naughtiness—it is in the blood—went several times up and down the street, and then, as always, home again."

In one of his books, Andersen alluded to a Portuguese wind as being like a hridal kiss, later sadly admitted: "But what do I know what a hridal kiss is like? I imagine so much—I know so little!"

The Tales. Andersen is generally considered the best of the fahulists; his immortal *Fairy Tales* have a perfection of form, a discipline and rhythm, a sprightly style not matched by the others.

All his life the Danish writer retained the sensitivity and wonder of a child, the innocence of eye of his *Little Match Girl*; and combined this with the gift of poetic imagination that transformed real experiences into parables that, for all their fantasy, are universal and eternal.

There is something of Hans Christian Andersen in all his stories; his unhappiness in *Heartbreak*, his suffering in *The Ugly Duckling*, his ambition in *The Fir Tree*. Deeply felt and simply phrased, they are witty, ironic, poetic, poignant.

Wrote Andersen: "I get bold of an idea and tell a story for the young ones, remembering all the time that father and mother are listening and we must give them something to think about too."

They are easy to write, he once said: "Just as you would talk to a child." But the original manuscripts in Copenhagen show them to be more than happy accidents, dashed off between sterner literary chores. The various versions attest to the constant writing and re-writing, the weighing of each word, the pruning and rearranging; the result of such discipline is seen in the economy and quick effect of the stories.

Complained a critic when the first volume appeared: "It's not writing, it's talking." And so it seemed: the prose was fresh, colloquial, graphic. Andersen never talked down to children, and he gave them honey, not treacle. The majority of reviewers found his work revolutionary. Enthused one: "From that moment a new prose was born in Danish literature; the language acquired grace and color, the freshness of simplicity."

The *Fairy Tales* met with considerable criticism (and still do). Argued one reviewer: "I can only find this form of literature entirely unsuitable for children. . . . Far from improving their minds, Andersen's tales might be positively harmful. Would anyone claim that a child's sense of what is proper would be improved when it reads about a sleeping princess riding on the back of a dog to a soldier who kisses her . . . or that its sense of modesty be improved by reading about a woman who dined alone with a sexton in her husband's absence?"

Andersen had a dark side, and many of his stories, horror-filled and depressingly sad, are not for young children. Yet *The Little Mermaid*, one of the saddest stories ever told, is one of the best beloved by children.

a pattern for emotional reaction offered to him with the consent of the adults."

Summing Up. Out of the sadness, suffering, dreams, and aspirations of a strange man came immortal tales that have fascinated generations of children and parents.

Rage to Live (*Amedeo Modigliani*)



Just over fifty years ago, a twenty-two-year-old Italian painter arrived in Paris, his lungs tubercular since adolescence, fiercely determined to cram many lives into his remaining years. Out of the next fourteen years of struggle, orgy, and tragedy in Paris, under the triple curse of sickness, failure, and poverty, a great artist emerged.

Doomed to his private hell of alcohol, drugs, and sexual excesses, Amedeo Modigliani sketched and painted furiously, everywhere and at all hours. Night after night, he lurched from one tawdry Parisian café to another, usually with his fellow alcoholic, Utrillo, often with some prostitute off the street. The next morning he dragged his aching body to the cellar of an art dealer, painted and drank steadily until night drove him back into the demoniac round of self-destruction. Tattered, trembling with cold, hunger, and fatigue, he clung to the shreds of life until 1920. A few hours after his death, grief-stricken Jeanne Hebuterne (his mistress since 1917 and mother of his daughter) leaped to her death from a roof.

The Paintings. Can psychologic techniques throw any light on Modigliani's twisted personality? Does the symbolism of his paintings offer a clue to his fantasies and emotional drives? Here are some notes by psychiatrist-writer Félix Martí-Ibáñez.

One modern psychiatric technique asks the subject to draw a human figure; usually it will be a figure which he unconsciously identifies with himself. This projection of the body image is as intimately related to the artist as handwriting is to the writer. First curious fact: Modigliani was stocky and square-faced, most of his painted figures are lean and thin-faced, with long torsos and swan-like necks.

His nudes were the most naked nudes in the history of art, shamelessly carnal, unreservedly erotic, displaying complete abandon and the cynical serenity of satisfied flesh. They were too much even for licentious Paris, in 1917 the police closed down an exhibition at the Berthe Weille Gallery on the grounds of indecency. The scandalous innovation: the artist reproduced the normal body hair distribution of women which countless artists before him had concealed or ignored.

Modigliani's dressed women are a strange contrast to the nudes. Most of them are proud, even majestic, give an impression of loneliness and isolation. Their postures suggest recoil, withdrawal within themselves, as if they are on guard against the environment. In both men and women the hands are frequently crossed in the lap, a gesture that could symbolize protection or concealment of the genitalia.

While some contemporary artists turned their backs on the human figure (Picasso's still lifes, Braque's mandolins, Morandi's bottles), Modigliani with death perched on his shoulder passionately loved living human beings. He painted people from all walks of life: fashionable opera goers, painters, poets, concierges, chambermaids, musicians, street urchins, prostitutes. Out of his rage for life he immortalized them all.

The Clues. Examined in detail, Modigliani's figures reveal many clues to his tormented psyche. Most striking feature in many of the pictures is the neck. Long, thin necks are frequently seen in drawings by psychosexually undeveloped schizophrenics. When a subject shows an obsessive interest in necks in projective drawings, it usually discloses a conflict between physical impulses and the mind's restraint: the neck divides intellectual life from biologic life impulses. Modigliani's abnormally lengthened necks reflect

the conflict between overpowering sexual impulses and a deep-rooted desire to dominate them through asceticism.

The Head. Modigliani's heads are distorted. In projective techniques, the head is the symbol of the ego, of social and intellectual power, the control of physical impulses. When a subject loses control over himself he usually compensates for the loss by enlarging the size of heads in drawing.

The Mouth. Modigliani's mouths are shaped like a Cupid's bow. Recurrence of this feature indicates a morbid interest in the oral region, characteristic of oversexed alcoholics and sufferers from psychosexual infantilism. Subjects of this type have a compulsive need to concentrate on the mouth as a pleasure-giving organ.

The Eyes. The strange half-closed eyes favored by Modigliani indicate emotional immaturity. The artist stares out at the world from a distance imposed by sickness and alcoholism. He keeps the eyes half closed to shut out the world, to concentrate solely on himself and his obsession with a sick body.

The Nose. The nose is highly significant in drawings made under projective techniques. In some Western countries, a flat nose is a symbol of sexual weakness and a tortuous personality. A small nose is considered attractive in a woman, not so in a man. In Spanish countries the word *chata* (flat nose) applied to a woman is an endearing term; to call a man *chato* implies he lacks virility. Conversely, a high nose (Casanova had one) is considered a symbol of high sexual potency.

Analysis. Modigliani's art reflects the psychologic secret of his personality as a man, in turn this determines the characteristics of his art. His longing for intellectual and spiritual self-discipline constantly struggled with the demands of overpowering sensuality. His dreams of physical and sexual vigor contrasted piteously with his weakened body and psychosexual infantilism. The desire for glory battled against the frustrations of poverty-stricken reality.

In his fierce devotion to human models, Modigliani revealed a terror of loneliness. In trying to immortalize his subjects by giving them the form of ageless idols, he revealed a burning desire to soar beyond the limitations of his own fast-expiring mortality. The

unique serenity and melancholy calm of the figures seen in the world's art galleries today reflect the peace that eluded the artist throughout his short and tortured life.

Leonardo's Smile (*Leonardo da Vinci*)



When a visitor recently hurled a stone at the Louvre's famous *Mona Lisa* painting, he may have been goaded by La Gioconda's (wife of Florentine merchant Francesco del Giocondo) maddeningly enigmatic smile. Many others have probably felt the same toward the puzzling portrait.

Equally infuriating at times is an even greater riddle: the personality of Leonardo da Vinci himself. A legend in his own time, he was famed as an artist, anatomist, musician, sculptor, engineer, optician, architect, inventor, writer. The illegitimate son of Caterina, a peasant girl, he remained with his mother for only a few years. Having no offspring from his first marriage, Piero da Vinci, a wealthy notary, took his son into his household, probably around his fifth year.

Young Leonardo apparently showed uncommon talent in drawing; about the age of sixteen his father apprenticed him to Andrea del Verrochio, one of the leading artists in nearby Florence. Leonardo later worked as either artist or engineer in Florence, Milan, Mantua, Venice, and Rome, spending his last few years in France where the generous and fun-loving Francis I provided a safe and comfortable haven. There he died in 1519.

Aloofness. Contemporaries describe the young Leonardo as

tall and handsome, with black hair, lofty forehead, sky-blue eyes. He was always exquisite and meticulous in dress. His mannerisms were sometimes puzzling, often tended toward effeminacy, yet he was strongly huilt. Outwardly he was always friendly, sympathetic, charming. Exceptionally sophisticated and urbane, he conversed with ease in any field at a time when cultural standards were high, but he was reticent and discreet about himself, somehow distant and aloof.

In most places where he worked he left a few artistic masterpieces, his technique reaching its zenith with such works as the *Last Supper* (c. 1498), the *Mona Lisa* (1502-06), *St. Anne* (c. 1507-13), *John the Baptist* (c. 1513). More often he left behind a litter of unfinished projects, tantalizing fragments of great art.

He was forever dissecting and sketching cadavers, scribbling anatomic sketches. He scrutinized fossils, birds, plants, also investigated topography. In his declining years his thirst for knowledge and experimentation became almost an obsession. Paradoxically, he could neglect his studies, refuse commissions from royalty and papacy to devote himself to painting the second wife of an obscure Florentine citizen.

His experiments were often grandiose, rarely completed. On page after page of his notes he penned: "*Di mi si mai fu fatta alcuna cosa.*" ("Tell me if anything was ever finished") Yet he devoted untold man-hours to designing and building grotesque and expensive toys, revolving stages, arranging gaudy pageants to titillate his patrons; he toyed endlessly with mathematical and geometric puzzles.

Although Leonardo left over five thousand pages of notes on an encyclopedic range of topics, he revealed next to nothing about his own personal feelings, hopes, joys, sorrows, made no mention of love for woman or man. Despite their phenomenal erudition and fantastic scope, his notes, carefully penned in his peculiar mirror script, raise more questions about Leonardo the person than they answer.

This seemingly kindly man, who bought birds in Florence's market places only to set them free, devoted tremendous time and energy to designing the most cruel weapons for human destruction. A lover of beauty, he could follow beggars throughout a whole

day, sketching their tortured appearance. What drove him in a frantic quest for knowledge that grew more frenzied with age, but never allowed him to complete most projects? Why was almost nothing ever heard of the works of his many pupils? What inspired him to paint the same perplexing smile on the *Mona Lisa*, *St. Anne*, *John the Baptist*?

Homosexual? Though centuries of art students and historians ruminated on the quirks of Leonardo's genius, the most controversial thesis came from the late Sigmund Freud in 1910. Said he: Leonardo was unquestionably a homosexual who sublimated his erotic urges first in painting, later in his unquenchable thirst for knowledge.

Freud built his case on a childhood memory that Leonardo once recounted: the infant dreamed that a kite alighted on him in the cradle, opened his mouth, then struck his lips several times with its tail. For Freud the alleged dream is in reality a screen memory: the bird's tail inserted into Leonardo's mouth symbolizes *fellatio*, and, by extension of the penis symbol, the breast.

From this he reconstructs the psychogenesis of Leonardo's homosexuality: in the absence of a father figure during his early years, Leonardo's attachment to his mother became a fixation, in later life he never betrayed his love for her. Freud buttresses his argument with certain facts about Leonardo's career and the nature of his works.

The artist was once accused of homosexuality (the origin of the charges is obscure, and they were apparently never proved). He constantly sought the company of young, handsome males, and his pupils were apparently chosen on the basis of their appearance rather than for talent. *Mona Lisa*'s tender but enigmatic smile Freud explains as the artist's fond recollection of his own mother, which might account for Leonardo's reluctance to part with the portrait.

Other Views. Later psychiatrists and psychologists have greatly modified Freud's oversimplified diagnosis of homosexuality, altered his interpretation of Leonardo's dream, sharply criticized the selectiveness and arbitrariness of his data. But most agree with his conclusions, since there is strong presumptive evidence in favor,

e.g., Leonardo's avowed revulsion to the act of procreation; his sketch depicting coitus is a caricature of the act.

Most art critics and historians either ignored Freud's analysis or roundly denounced it as slanderous and mendacious. Others noted that Freud erred in transposing attitudes on illegitimacy, dress, mannerisms of his own time to Leonardo's. Far from being over-protected and overloved by his mother and totally deprived of father figures in infancy, Leonardo probably enjoyed a normal infancy with numerous uncles, aunts, cousins to satisfy his psychic needs. Italian families of that day were close-knit, almost tribal units, bastards included.

Male attire in Leonardo's time was colorful, elaborate, but not necessarily foppish; upper-class Italian men saw nothing effeminate in using scents, though the French at the time considered the habit somewhat odd. The absence of any mention of attachment to females in Leonardo's notes does not prove that there were none in his life. His natural reluctance to dwell on personal matters may have kept him from cataloguing his conquests.

That Smile. Many interpret the smile of the *Mona Lisa* as the synthesis of womankind itself, revealing the instincts of seduction and conquest. Historically it may have been merely a refinement of Verrochio's teachings, for many of the faces of Leonardo's teacher show a subtlety of expression approaching that of his pupil's later works.

Another theory is that the baffling smile represents the logical culmination of Leonardo's assiduous anatomical studies, for he succeeds in arresting the rictus muscles before their movements converge.

Five hundred years after Leonardo's birth, the enigma still stands. Millions of words attempting to analyze the whole personality of the artist have merely compounded the conundrum. The strange smile of the *Mona Lisa* may thus be no more than a reflection of a perplexing genius' own skeptical aloofness toward the world, the inward smile of Leonardo himself.

Flame and Shadow (*El Greco*)



One day in Renaissance Venice a young artist sat trancelike in his tightly shuttered studio, eyes covered with his massive hands. When a friend asked why he preferred the darkness he solemnly replied, "My light is within me."

Some four hundred years later, the words of Domenieos Theotocopoulos, better known as El Greco ("The Greek"), are just as puzzling as when first uttered. To some, the portrayer of piety was anything but pious; to others he captured on canvas the essence of Christian fervor. On one point there is fairly general agreement: the remarkable Greek became one of Spain's greatest painters

The Life. Born about 1542, probably in Candia, capital of the island of Crete, he may have studied iconography and theology under Greek Orthodox priests. Aged about twenty-five he emigrated to Venice (which then ruled Crete), where he studied under the aging Titian, possibly also under Tintoretto and the Bassanos. Two years (c. 1573-75) were spent in Rome.

In 1577 he was in Toledo, some forty-seven miles southwest of Madrid, which had been the political capital of Spain until 1561 and still wielded a powerful influence in the country's cultural and spiritual life. After a legal battle over one of his paintings for the

Toledo Cathedral, El Greco and a group of helpers painted furiously to keep up with the demand for Saints, Virgins, Crucifixions, other sacred scenes.

El Greco lived well, with a large library of works on theology, art, architecture, mathematics, poetry, medicine (including a work by Hippocrates).

During his early years in Toledo he cohabited with Doña Jerónima de las Cuevas as his common-law wife. She bore him a son, Jorge Manuel, in 1578, but nothing is known of her ultimate fate. He became poor in his declining years, although he painted compulsively to the end, which came on April 7, 1614.

The Work. El Greco's early Italian paintings are not considered as particularly outstanding. But in Toledo his style changed almost miraculously. Earliest example, which overthrew current rules of Western art, was *The Martyrdom of St. Maurice*.

He abandoned the rich harmonies of the Venetians, replacing them with glittering white, vibrant oranges and reds to give the illusion of dancing flames. In later works, colors ranging from stark white to somber black produced a shimmering light that conveyed frenzied motion and vitality even in landscapes, e g., *Toledo* in New York's Metropolitan Museum of Art.

One noteworthy feature in El Greco's choice of subjects is that he shunned the wealthy fat nobleman of his time, preferred emaciated errant knights and asthenic women; this might also explain his aversion to Michelangelo's athletic humanity.

When he painted real people he gave them a "spiritual" look but did not deform them. In his famous *Burial of Count Orgaz* the figures in the lower section are realistic, whereas God and the angels above show the typical El Greco mystical elongation.

In some works, the Christs and saints are elongated to resemble flames or cathedral candles. In time, this flamelike quality was accentuated: lines become wavy, the flames vibrate frantically.

El Greco was also enormously preoccupied with shadow, possibly influenced by the Oriental notion that the shadow of a body is the image of its soul. For the painter, the shadow was the "double" of the body, thus celestial beings were seen as "humanized" shadows, i.e., the shadow of mortal bodies elongated by a setting sun.

For an explanation of the weird expressions on some of El Greco's saints and martyrs, Spain's noted endocrinologist Dr. Gregorio Marañón proposed the theory that the artist may have used inmates of the Toledo insane asylum for his models.

Psychology. Less than a century ago many art critics thought El Greco was a reasonably able painter who was insane. They reasoned that only a demented man could have distorted heavenly figures with such apparently diabolical cleverness. Few today believe that El Greco was any more abnormal than other geniuses.

One theory about El Greco today is that his greatness resulted from a strange symbiosis between the painter and the city of Toledo. There the wandering Cretan found an atmosphere saturated with asceticism and mysticism, yet tolerant and sophisticated, wholly attuned to his own psyche. The spectral quality of the ancient city, rising like a ghostly castle in a bleak plain, encouraged a feeling of otherworldliness.

His elongated ecstatic saints may thus have arisen from prodigious attempts to paint spirits as he saw them inwardly, possibly in an effort to communicate with his God through brush and palette.

Art lovers today have little doubt that El Greco's inner light blazes as fiercely as ever.

Nonconformist Spaniard (*Pablo Picasso*).



Recently described in a French government publication as "refractory, unruly, outside the law," painter-sculptor-lithographer-ceramist Pablo Picasso entered his seventy-ninth year last October as the greatest non-conformist in twentieth-century art.

Youth. Born in Malaga, Spain, in 1881 to an impoverished painter and art teacher Don José Blasco Ruiz and his wife Maria Picasso, young Pablo was a child prodigy who could pass art examinations in one day where others needed a month.

At nineteen, he made his first attempt at life in Paris, was forced by hunger and cold to return to Spain three times, finally established himself in a Montmartre garret in 1904. During this period he painted hungry children, cripples, blind beggars, emaciated family groups, all in a range of blues that created his first "period." Picasso later explained that this persistent monotone was the result of an "inner necessity" to paint in that manner. Earlier than that he had painted *Le Moulin de la Galette, à la Toulonaise-Lautrec*.

Gertrude Stein, American medical student turned writer, and a wealthy Russian merchant were among the first buyers of Picasso's works. His prospects brightened, so did his palette. The "rose" period was ushered in with nostalgic circus families and melancholy acrobats in rosy hues.

Cubism. With France's Georges Braque, Picasso in 1908 reduced first landscapes, then furniture and musical instruments, to blocks and facets. Each form became a construction, many-sided and angular. Planes were multiplied, displaced, rearranged, and flattened until the original object all but disappeared.

When the stage of taking apart had gone as far as possible, the two artists turned about-face and built up forms with large flat shapes, passing from analytic to synthetic Cubism.

Growth. In next two decades, Picasso adopted and exhausted a bewildering succession of manners. In the late twenties, he distorted and displaced parts of the body, sometimes weaving them into flat patterns, at other times representing bonelike structures of towering proportions.

He painted fantastic portraits, simultaneously full-faced and profile, often grotesquely drawn but conveying movement with baunting reality. When his marriage to Russian ballerina Olga Koklova broke up in 1935, Picasso was deeply affected.

During the Spanish Civil War, Picasso protested against the brutal bombings by German and Italian planes of a defenseless Spanish town by painting the savage and powerful *Guernica* mural, now reputed to be worth \$250,000.

Health. Described as somewhat of a hypochondriac, Picasso suffered a kidney ailment as a child, caught scarlet fever later. At seventy-five, he was in buoyant health, works ten to twelve hours a day, keeps himself in excellent physical trim, compact and muscular.

Fame. Millionaire several times over, Picasso today lives "like a poor man with a great deal of money." In Paris he works in a large, elegantly dilapidated studio on Rue des Grands Augustins. What endears a home to him are not grand furnishings or a fine view, but the clutter of odds and ends that he constantly accumulates, never cleans out.

Picasso, biographer Sabartes said, keeps "everything he has ever laid hands on." To the melange that piles up from the mail, gifts from friends, quixotic purchases, he adds a precious hoard of things he picks up on beaches, in gutters and junk heaps. The head of his recent bronze, *Baboon with Young*, is formed from a child's discarded toy automobile.

While oblivious to luxury, his wealth is handled carefully. Picasso gives generously and often anonymously to needy artists or causes, but he almost never gives a picture. He is known as a shrewd businessman. He hates travel, is indifferent to food, drink, and music, cannot give orders to servants, and puts off everything except painting until an improbable *mañana*.

He has inspired lasting friendships among some of the world's most illustrious writers, poets, and painters. They excuse his frequent unreasonableness, enjoy his magnificent appetite for life and his wit.

Creation. In Picasso's eyes nothing that the eye sees or the hand touches is trivial. Says he: "The artist is a receptacle for ideas that come from all over the place: from the sky, from the earth, from a piece of paper, from a passing shape, from a spider's web."

He remakes what he sees in accordance with impulses that follow in rapid succession, each form suggests other things, other feelings. Said he, "I begin to paint flowers and I end by painting a mandolin." When he paints a mandolin he takes it apart in imagination, displaces its curves, twists its neck, sinks the body color into the tablecloth, raises the color of the cloth into the mandolin.

His rearrangements obey the laws (if not the appearance) of nature, seem to have an unalterable rightness. "A picture is a lie," he once said, "a lie that makes you realize the truth."

Time-Space. Physicians can appreciate one type of Picasso distortion: the interior-exterior view of a head or figure. Through x-rays it is possible to see inside and outside an object at one time. In the head of a weeping woman in the *Guernica* mural, the elaboration of tear ducts and nasal cavities projects the sensation of weeping; the tears are "felt" by the onlooker.

His side and full-face portraits inaugurated during Cubism and developed in later work express the total image conceived by the artist in his imagination, similar to views with a stroboscopic camera. Picasso telescopes such impressions by combining in the same image features as they appear from different viewpoints; in adding the dimension of time to that of space he creates in painting a time-space continuum, as in modern physics.

Today. Picasso still works from three o'clock until after mid-

night on ceramics and sculpture in his ramshackle but comfortable Victorian villa in the hills above Cannes. He has weathered a number of political storms and some personal ones. As long as there is a wall, a brush, a crayon, or even his finger to scratch an image in the sand, he will go on making his own discoveries in art and breaking the conventions set up by others.

Declares he: "Art is not a canon of beauty, but what the instinct and brain can conceive beyond any canon. When we love a woman we do not start by measuring her limbs."

Art and Medicine



The artist has a twofold relation to nature, he is at once her master and her slave. He is her slave, inasmuch as he must work with earthly things, in order to be understood; but he is her master, inasmuch as he subjects these earthly means to his higher intentions and renders them subservient.

—Goethe *Conversations with Eckermann*,
1827

Whereas it might appear at first glance that there is a wide gulf between the scientifically trained physician and the creative artist, history shows that these two have often worked hand in hand for the greater good of mankind.

Goethe's quoted description of the artist's relation to nature could with slight modification be applied to the physician: the "earthly means" of science have in all great physicians been subservient to "higher intentions." In wider retrospect it was no mere figure of speech when William Osler, one of the greatest medical teachers of all time, always referred to medicine as an art.

In this brief survey of the scalpel and the palette (or chisel), MD explores the time-honored partnership between medicine and art.

Antiquity. Primitive man believed disease to be a demonic

influence exerted by a spirit or an enemy; to combat disease the medicine man used natural substances such as herbs, or he used art. He was frequently also an artist who fashioned charms and fetishes to placate the hostile and mysterious powers.

One of the earliest known representations of the human figure is the "Venus of Willendorf," small limestone statuette of a steatopygous woman discovered in 1908 in deposits of the Middle Aurignacian period (40,000 to 15,000 years ago). Some claim that it represents a sympathetic-magic symbol of fertility similar in intent to the hunting scenes painted on cave walls.

Other examples of primitive magico-medical art: the "substitution dolls" used on the Nias Island (Indonesia) to frighten away disease demons; effigies representing disease-producing spirits used by the Punan of Borneo. Most elaborate example is the Navaho art of sand-painting used in therapeutic ceremonies: the medicine man creates stylized designs in the center of which is placed the patient; if the spirits disapprove of the artistry they turn away and let the patient die, if not, they allow him to recover.

In recorded history, the early Babylonian priests collaborated with clay modelers to fashion reproductions of the liver (regarded as the most vital organ), divided into squares and studded with prophetic inscriptions; these were used for divination.

Ancient Egyptian artists seemed to find a fascination in portraying medical themes: bas-reliefs in the tombs at Sakkara (c. 2500 B.C.) depict surgery on hands, feet, and dorsum, circumcision, massage, delivery. The man who would become the Egyptian god of medicine Imhotep (born c. 3000 B.C.) combined in his lifetime the arts of physician and architect. He was the architect of the oldest monument extant, the pyramid of Sakkara, near Cairo.

In the Greece of Hippocrates, art and medicine reached their first momentous confluence in history. In that Golden Age, artists carved out pure forms of anatomic beauty, while the Hippocratic *iatros* sought to establish medicine on a sound study of nature.

Although Hippocratic knowledge of anatomy was scanty (except for the skeleton) due to the horror of the anatomic dissection of cadavers, this fertile period demonstrated that both artist and physician had freed themselves from much of the magic and sym-

bolism of earlier ages and were united in taking the individual human being as their model

In this unique age, artist and physician were imbued with the same passion for observation. Said the Hippocratic doctrine "It is necessary to begin with the most important things and those most easily recognized. It is necessary to study all that one can see, feel, and hear, everything that one can recognize and use."

For the Praxitelean artist, says art historian E. H. Gombrich "The old idea that it was important to show the structure of the body spurred the artist on to explore the anatomy of the bones and muscles, and to build up a convincing picture of the human figure which remains visible even under the flow of the drapery."

Interesting parallel: Polyclitus' torso of a warrior youth in contest with an Amazon shows what appears to be a crural hernia. Not until some 2000 years later did modern dissection and experimentation show that the athletic warrior's position revealed the forcibly contracted pectineus muscle, not visible in repose.

Contrasting starkly with the great awakening of art and medicine in Greece was the somnolence (if not decay) of these two arts in Roman culture. During most of these centuries, artists and physicians were accorded the same scant recognition.

Results when not directly copying Greek models, Roman artists slurred over anatomic details, ignored the Greek ideal of harmony and beauty. For the Roman architect Vitruvius the human body was merely a pattern of proportions to be followed in constructing public edifices.

Concurrently, Roman physicians (mostly immigrant Greeks) were more concerned with preserving their precarious foothold in Roman society than with formulating new or revolutionary concepts of medicine. As art stagnated, so did scientific medicine.

Middle Ages. In this era of contempt for the human body and of anxious speculation about the hereafter, medicine returned largely to magic and sorcery, anatomic representation, except in isolated instances, became rigid and symbolic, copied and recopied by artists who knew as little about anatomy as did physicians. Fragments: a Brussels manuscript of the ninth century showed different positions of infants in the womb; in the eleventh and twelfth centuries miniatures were used to illustrate some medical

texts, e.g., Roger's *Surgery* represented surgery for nasal polyps, hernia, hemorrhoids, cataracts.

One of the earliest pictures of an autopsy is in a thirteenth-century manuscript where the physician is shown holding a liver; from his expression and those of the people entering the room, he has been caught in the act of dissecting.

Many fourteenth-century manuscripts contained a series of five schematic drawings of human beings in a squatting position, representing osseous, nervous, muscular, venous, and arterial systems; sometimes a sixth figure was added to represent the pregnant female or the male and female reproductive organs. The poses were almost always identical; so were such anatomic peculiarities as a shoe-sole-shaped spleen, a five-lobed liver, heart and lungs shaped like hazelnuts, and a uterus with six chambers and the suggestion of a seventh. These figures were not original, were supposedly copied from a third-century model.

The *Antropologium* (1501) of Magnus Hundt and the *Margarita Philosophica* (1503) of Gregor Reisch printed conventional illustrations of the bloodletting manikin for instruction in venesection; the zodiac manikin, the zodiac figures connected with the various viscera; the planet man, the planets replacing the zodiac signs; the wound man, showing sites for ligation. Reisch's book also contained a view of the thoracic and abdominal viscera and the oldest schematic representation of the eye.

The first printed medical text containing original illustrations was the *Fasciculus Medicinæ*. Compiled by German physician Johannes de Ketham from various treatises on uroscopy, pregnancy, bloodletting, epidemics, and surgical procedures, it was published in Venice in 1491.

Verrochio (1435-88) was the first artist to make casts of the human body for use in medical schools. His flayed figures, accurately and artistically moulded in wax, terra cotta, or plaster, or carved from marble, demonstrated all the muscles in action.

Renaissance. With the great rebirth of classical ideas that ushered in the Renaissance, art and medicine shook off a thousand years of stagnation. As the humanities challenged the divinities, and the constricting fetters of medieval scholasticism dropped away, Renaissance man sought a relationship with nature; he

looked inward at his thoughts and outward at his body. In the humanist view, man became the measure of all things.

The new and exciting idea of human individuality spurred the study of the forms and functions of man, causing medicine once more to join forces with art. The Renaissance artist strove for anatomic exactness, drew bodies in which no bone or muscular defect was overlooked. Benvenuto Cellini wrote ecstatically: "The admirable bones of the head, the shoulder blades which, when the arm is raised, produce magnificent effects, and the five floating ribs which, when the torso is bent backward or forward, form marvelous projections about the navel. You will draw a bone which is located between both thighs; it is very beautiful and is called the coccyx or sacrum. You will draw the vertebrae because they are magnificent."

A few geniuses developed an interest in anatomy for its own sake. Michelangelo (1475-1564) created living bodies with a strength and dynamism that has never been surpassed, using living models and dissecting cadavers bought from gravediggers. In his studio, working by the light of a candle stuck in the navel of a cadaver, he studied the human form externally and internally; how well he learned his lesson is seen in his *David*, *Virgin and Child*, and in the tremendous figures in the Sistine Chapel.

Raphael (1483-1520) painted his round, lush figures with anatomic fidelity; in his *Fainting Virgin* the skeleton is shown collapsing under the weight of the body. His unfinished *Transfiguration* beautifully illustrates muscle relief, lumbar contour, the flexed back of a kneeling woman.

The anatomic studies of Durer (1471-1528) were produced in four books on the human figure: two describe its proportions as a whole or as separate members related to a constructed scale; the third deals with proportions according to mathematic rules; the fourth shows figures in motion. One curious Durer drawing was sent to his physician, pointing out a painful area of his body (enlarged spleen?).

The titanic Leonardo da Vinci initiated a new era in anatomic art. One great contribution was the belief that only by careful observation and accurate portrayal of the parts of the body would the mechanisms of their function be discovered.

Cadavers were his textbooks. In collaboration with physician

Marc Antonio della Torre (1478-1511), one of the most famous anatomists of his day, da Vinci worked in the mortuary of the Santo Spirito in Rome dissecting some thirty bodies and accumulating more than a thousand sketches.

His drawings of the skeleton were among the finest, a radical departure from previous illustrations; most of them could satisfy modern standards.

In drawing the human skull, da Vinci demonstrated for the first time the frontal maxillary sinus, having invented a method of anatomic demonstration by injecting the cerebral ventricles with melted wax to determine their contour and ramifications.

Many of his drawings dealt with the cardiovascular system: he was the first to describe the atria as separate chambers; he discovered the moderator band and suggested its function of preventing overdistention of the ventricle. His drawings of the respiratory and reproductive systems are in the main accurate.

The artist had planned a great encyclopedia of anatomy, but when his physician-collaborator della Torre died, the project was abandoned. The over-all influence of da Vinci's monumental work in anatomy on the course of contemporary medicine is debatable. His notebooks were shown only to a few (most of them not physicians) and they fell into oblivion until they were discovered in the Windsor Castle library in the eighteenth century.

But with the publication in 1543 of *De Humani Corporis Fabrica* by the Paris- and Padua-trained Andreas Vesalius (1514-64) was celebrated the most famous marriage between art and medicine. The first complete illustrated text of human anatomy, it has been called the most significant book in medical history and one of the most beautiful works of art.

In the *Fabrica*, Vesalius' text was magnificently complemented with illustrations credited by some to Stephan van Calcar, a pupil of Titian. The *Fabrica's* artist must have given close attention to the dissection of cadavers; his drawings have led some to the opinion that his knowledge of anatomy equaled that of Vesalius.

At the same time there is reason to believe that Vesalius, who was himself a competent draftsman, made many of the anatomic sketches from which the illustrations were developed. Careful examination of the plates of the *Fabrica* indicates differences in

style that raise the suspicion that several artists participated in the work. There are also Vesalius' own statements that he used several draftsmen and that some of the illustrations are by his own hand.

The background to the muscle plates formed a continuous landscape, which Harvey Cushing identified as the region around Abano Terme, near Padua, showing among other things the ruins of a Roman *thermae*. Certain mannerisms indicate that the landscapes were painted by Domenico Campagnola who at that time worked as a draftsman for Titian.

The title page to the first edition of the *Fabrica* is a superb work of art of that period, both in the composition and the engraving. It shows Vesalius surrounded by students, fellow physicians, rectors of city and university, sundry dignitaries of church and nobility. He symbolizes the break with authority by standing on the floor instead of sitting in a pontifical chair.

The epoch-making book crystallized all the artistry that Renaissance painters had evolved, while it gave medicine a solid foundation of anatomy. The history of anatomy after Vesalius is one of increasingly exact investigation. Thirteen years after the *Fabrica*, anatomist Juan Valverde and painter Gaspar Becerra, both Spaniards, collaborated on *The History of the Composition of the Human Body*, a re-creation of Vesalius' great work. Valverde corrected the order of description and improved the morphology; the drawings were in the style of the *Fabrica*, but improved both artistically and scientifically.

Other instances of fruitful collaboration between artist and anatomist: Venetian artist de Musis drew the plates for Eustachius; Paolo Veronese is credited with designing the frontispiece of Realdo Colombo's famous *De re anatomica*.

As printing and engraving techniques constantly improved during the eighteenth and nineteenth centuries, more complex anatomic relationships were able to be reproduced. Notable for their exact illustrations were Caldamy's anatomy, Tiedemann's atlas of the uterine nerves, William Hunter's *The Gravid Uterus* (1774).

During the nineteenth century, the development of engraving techniques, photography, and subsequently photoengraving, immensely furthered the progress of anatomic teaching. But that century also spelled the dissolution of the 2000-year-old sporadic

partnership between art and medicine in the development of anatomy. From that time the two arts became complementary in some fields, largely in medical education and some branches of therapy.

In the fields of painting and sculpture, art and medicine were in this century parted with all the explosive force of fissioning atoms. Whereas they had previously both sought for truth in the human form, art careened off into imaginative cubism and surrealism, while medicine burrowed into a meticulous scientific accuracy.

The twentieth-century artist dynamited the painstakingly evolved anatomy of his predecessors into fragments, then reconstructed figures to suit the pattern of a transitory art *genre*. Meanwhile the twentieth-century medical scientist reduced the human body to its smallest components of cells and their molecules, and the medical profession split the patient among a score of specialties. Whereas Praxiteles and Hippocrates had sought to unify the body with nature, the twentieth-century artist and physician used the palette or microscope to magnify the parts above the whole.

The last discernible link between art and medicine was possibly expressed in the surrealist movement (now passé), which owed much of its impetus to the psychoanalytic theories launched by Sigmund Freud and his disciples. The surrealists proclaimed that true art could emerge only from the artist's inner consciousness, repository of rich fantasmagoria. Having divorced anatomy, art flew into the arms of psychiatry. Whether either partner profited from the union is a moot point.

Therapeutic Art. In a less exotic field than abstract painting, psychiatry has derived some profit from art. Knowing that, through the ages, man has expressed and released his emotions and ideas through art, physicians have used this impulse in therapy.

Painting or modeling have been found to be effective outlets for creative energy in physical illnesses, especially when movement is restricted. Art work takes the patient's mind off his ailment, passes the time, and aids in convalescence.

Art is utilized in psychiatry in two ways: for its therapeutic and rehabilitative functions and to facilitate diagnosis of mental illness. Using painting as an objective discipline, disturbed patients learn

to cope with formal relationships in line, color, perspective, thus move toward learning to cope with reality.

Some psychotics, unable to communicate verbally, get the urge to create, in many cases communicate through art. Painting permits the psychotic to translate his unconscious images into symbolic forms, providing the psychotherapist with valuable clues.

Art done by schizophrenics usually displays similar characteristics: a tendency to crowd the picture and fill all available space, stereotyped rigid shapes, a hypertrophy of symbols. Case history: a schizophrenic girl aged nineteen was classified as near-hopeless; insulin coma, electro shock, narcoanalysis, and group therapy had all failed. Unable to verbalize normally the patient began to paint: drawings were bizarre, gloomy, constrictive, though some order and purpose were evident. She made the same comments about similar objects in various paintings; they symbolized her fears, her concept of herself and of the world. Eventually she was able to communicate with the psychiatrist in the language of symbolism, began explaining what the paintings meant to her.

As the patient improved, the paintings changed. Most early drawings were symptomatic, dealt with the way she felt; later ones were concerned with her basic conflicts. Approaching normality after several months, the girl could no longer evoke ideas from her subconscious, became unable to paint. Medicine and art had joined briefly to heal the breach in a human psyche.

Hospital Art. Applied art plays a therapeutic role in the design and decoration of modern hospitals. Exterior and interior design, furnishings, color, and materials are integrated into a harmonious whole that emotionally affects patients and staff.

The hospital architect and interior decorator are nowadays briefed on new trends in medical treatment, new advances in surgery: they interpret these data in terms of physical and psychologic environment. Said Florence Nightingale in 1862: "The effect [on the sick] of beautiful objects and especially of brilliancy of colors is hardly at all appreciated. . . . People say the effect is on the mind. The effect is on the body, too."

Children respond happily to bright colors in pediatric areas; waiting rooms are painted in cool tones; warm bright colors are used in orthopedic rooms, soft restful tints in physiotherapy rooms;

corridors and day rooms are decorated in stimulating colors that encourage early ambulation. Many modern hospitals hang paintings in rooms, lobbies, and corridors; both reproductions and originals are used, ranging from the classic to the abstract, they produce a warm, friendly atmosphere.

Medical Art. Harvey Cushing (1869-1939), famous Boston neurosurgeon, always urged medical students to cultivate their artistic talents, said that a fracture was more easily drawn than described. Dr. Cushing followed his own advice, illustrating his case histories with considerable ability.

A modern department of medical illustration has a broader function than merely to supply illustrations for texts; it is designed to provide all the graphic, photographic, and visual education needs of a medical school. Illustrators and physicians work closely in planning drawings; the properly trained artist can be of invaluable assistance to the physician in determining the most effective methods for presenting visual aids to teaching.

The most outstanding medical illustrator of modern times was Max Broedel (1870-1941). An accomplished artist and medical researcher, Broedel came to America from Germany in 1894 to illustrate Dr. Howard Kelly's *Operative Gynecology*, established in 1911 the department of medical art at Johns Hopkins, first of its kind in the world. Through his students and family, Broedel influenced the whole development of medical art.

Medical art departments have been established at the University of Illinois College of Medicine in Chicago, Massachusetts General Hospital in Boston, Southwestern School of Medicine in Dallas, Texas, among others. The Federal Government established an art section as a branch of the Chief Surgeon's Office in 1918.

The medical art student (generally a graduate student who has majored in fine arts, plus premedical subjects) spends three post-graduate years studying anatomy, pathology, and physiology, also studies visual arts techniques, the preparation of teaching models, the construction of prosthetic devices.

Standards for medical art courses are set up by the Association of Medical Illustrators "to promote the study and to encourage the advancement of medical illustration and allied fields of visual education, to promote understanding and cooperation with the

medical and dental professions . . . and to advance medical education."

Goal of the medical artist: "to reveal the truth and make it apprehensible through visual media, with the fidelity of the scientist and the imagination of the artist."

Perhaps the most outstanding American medical artist today is Dr. Frank Netter, wartime medical artist and graduate of New York University College of Medicine.

Philosophy. William Osler once wrote that medicine and art were both exacting mistresses. He could have added that throughout history medicine and art have appeared to enjoy the same mistress.

Both share a common origin and heritage, both are engrossed in the study of man and nature. While superficially dissimilar, the artist and physician are philosophically surprisingly alike. Wrote biochemist Professor Philip Siekevitz (Rockefeller Institute):

"The highly rational world of experimentation rests upon nothing more nor less than an abiding faith in the rationale of the experimental approach. This faith rests upon no fact . . . it is not any less in degree than that which adorns the mystic in his search for love, or perfuses the artist in his reaching for beauty. Thus the scientist is like the artist and mystic in the faith which he places in his power to describe Truth according to his light."

The last word is by Dr. Karl Sudhoff, one of the greatest of modern medical historians from the land of Goethe. Wrote he just fifty years ago: "He to whom the Savior-like calling of the physician has been revealed in all its fulness, asks no longer about the connecting threads between medicine and art; he sees with a wide sweep of vision the wonderful shining texture of all the arts, how they weave into it and through each other as the great comforters of mankind."

Anatomy of Ballet



Physicians who watch ballet dancers pirouetting on toes or leaping through the air with the greatest of ease must often ask: How does the human body do it? It seems that with the right training the musculoskeletal system can do almost anything.

History. The Western form of ballet began when a theatrical plot and song were introduced into ancient Roman pantomimic dances. This form flourished in fifteenth-century Italian princely courts, was later introduced into France by scheming Catherine de Medici to distract her royal son from affairs of state. France's Louis XIV, the "Sun King," was an ardent ballet performer. When he got too fat, ballet became less popular at his court.

Classical *corps de ballet* disappeared from Europe with the French Revolution, persisted only in Russia. At the turn of the century, America's Isadora Duncan broke with classical tradition, introduced emotional expression into dancing. From the clash between the old and the new forms in 1907 emerged the Fokine type of ballet that swept away two centuries of tradition, allowed ballet to express itself in any form required by the subject.

Physiology. Most dancers begin training at the age of nine or ten. They are drilled incessantly in posture, balance, and coordinated movement; acquire highly developed ocular and ves-

tibular reflexes. Before beginning to dance, they must spend many hours at the *barre* (exercise bar on a wall) straining while a teacher barks, "Don't roll your feet, straighten your knees, pull up your thighs, lift up your hips, stretch your ribs, lengthen your back, lower your shoulders, loosen your neck, raise your eyes, look upward."

Obvious emphasis is on training the feet. Most ballet movements are the same as in everyday life, though with a larger range of movement. But the foot must become strong, supple, as sensitive as the hand, to be used in positions and movements way outside the normal range.

A flexible foot is created by systematic stretching of the tarsal ligaments. In classical ballet one seemingly unnatural position causes the arch to disappear, reappearing only when the muscles spring into action. Unlike the flat foot, the relative position of the bones is not changed, though wrong early training can cause arches to fall.

In one basic exercise, dancer stands at the *barre* with each foot holding the ground at three points: the back of the calcaneus and the heads of the first and fifth metatarsals. One foot is turned at right angle until forefoot aligns with back of the supporting foot, while leg retains its natural angle in a vertical position. This brings the inverters, tibialis anterior and posterior, into strong play to prevent abduction of the forefoot.

After footwork is mastered, dancers go on to exercises involving the entire body, keep at it until movements can be achieved by reflex rather than by conscious effort. Finished dancers continue to train five or six hours a day the year around, maintain peak physical condition, which most athletes would envy. Unlike athletes, they do not fade rapidly in middle years. A dancer may reach career height at thirty-five, may still be dancing at fifty, or later.

Hazards and Therapy. Considering the long hours of ballet training and dancing, accidents are surprisingly few. Most frequent disabilities are strains and sprains of the ankle. Other hazards: inflammation of the tibialis posterior tendon, synovitis in the Achilles tendon, slipping cartilage in the knee, sacroiliac and low back strain (mostly in men who lift partners), groin pain from

stretching the sartorius and abductor longus muscles. Most feared by dancers is enlargement of the big toe joint, usually resulting from poorly executed *pointe* work; this makes dancing painful and can end a promising career.

Dance training has therapeutic value, a fact well known to ancient Greeks. Socrates practiced and advocated dancing for health. Ballet improves posture and balance, is useful in tightening thigh muscles to correct bowlegs and knock knees. When knock knees are marked, the body's weight falls unevenly, putting excessive strain on knee and foot in *pointe* movements. Ballet exercises are usually made easier when used therapeutically.

Prize exhibit for ballet as a body builder is Alicia Markova (Alice Marks), frail, flatfooted, knock-kneed London child who took up "fancy dancing" on a physician's advice, went on to become a star ballerina. Another is dancer-choreographer Ted Shawn, who was partially paralyzed after an overdose of diphtheria serum, took up dancing as a remedial exercise. Anna Pavlova, perhaps the greatest woman dancer of all time, was a premature baby, grew as a weak child through measles, diphtheria, and scarlet fever.

Curious influence of anatomic anomaly on the art itself is Martha Graham who developed one-legged kick and skip pattern, used it to brilliant effect for twenty years. Explanation: the dancer could achieve a spectacular 180-degree kick with her left leg but not with the right, built her repertoire around that fact; others imitated her and a new style emerged.

Psychology. Ballet's emotional content reaches back to primitive dancing. Man probably began dancing out of sheer physical exuberance, learned later to use it as communication form in courtship and socio-religious ceremonies. Dancing is older than man: highly stylized courtship dances are found in some animals, many birds.

Ballet dancers live and work in a world apart, sometimes develop psychic trauma through overidentification with their art. Famous case is that of Vaslav Nijinsky, generally acknowledged as the greatest male dancer of all time. His career ended tragically in 1919, in schizophrenia, after some twelve years on the stage.

Ballet imposes particular psychologic strain on women. In her

soul-searching autobiography, *Dance to the Piper*, Agnes DeMille notes that women dancers usually lead skimp, incomplete sex lives, often develop physiologic dysfunctions such as amenorrhea. Wrote she "The ballerina pays dearly for her art. She is rooted in air. The fruit of her womb is gesture. Dedicating her life to her own body, she sacrifices the reality of her children's bodies and that of her husband."

Other psychogenic danger is overcompensation for ballet's physical and emotional demands through eating. Many young dancers periodically go on a "carbohydrate binge" of cream puffs, pastry, or chocolate parfaits, must then work twice as hard to regain svelte figure. No special diet has ever been devised for dancers.

Most ballet troupes today have a physician either attached to the company or in regular attendance. The Royal Academy of Dancing in London has its own eminent consulting surgeon. From the marriage of two arts, medical and terpsichorean, new and sometimes incredible gymnastic beauty has emerged.

Dramatic Anatomy



A play is a living body.

—Alan Downer: *The Art of the Play*

Hippocrates likened medicine to the theatre and the practice of medicine to a play with three characters: the patient, the physician, the disease. Writers on the theatre have expanded the analogy, described a play as an organism with an anatomic structure and a life of its own.

Physicians are especially vulnerable to the *virus dramaticum*, among those afflicted have been Anton Chekhov, Somerset Maugham, Friedrich Wolfe. For the guidance of any aspiring physician-playwrights, *MD* here examines the changing anatomy and physiology of theatrical productions throughout the ages.

Evolution. The ritual drama dates back to the Osiris passion play annually performed in ancient Egypt. The first known play review in theatre history describes a performance c. 2000 B.C.; the reviewer was a royal appointee who stage-managed the production and played several leading roles. Story of the play is the murder of Osiris by his evil brother Set, who cut up the body and scattered its pieces; Osiris' wife Isis and his son routed the enemy, gathered the pieces, and restored the god to life. Form of the play was a pageant-procession bearing Osiris in his sacred boat from the palace to the temple, thence to the tomb and back to the palace, interrupted on

the way for numerous sham battles and a three-day search for the severed portions of the body, ending with the great resurrection scene. Many actor-warriors reportedly died of their wounds, prisoners taken in the battles are supposed to have served later as human sacrifices.

The themes of the classic drama evolved in the golden age of Greece came from legend and history, the audience knew the end of the play before it began, the playwright's task was to devise a new way to tell an old story within a strictly prescribed form.

Greek drama originated as ritual celebration, its first form was a choral recitation, the *dithyramb* (literally, "goat-song"), probably with musical and dance accompaniment, telling the story of Dionysus, the young god of wine and fertility. At an unknown point in the evolution a soloist stepped forward and the dithyramb became a dialogue between leader and chorus, the beginning of drama.

A typical Greek tragedy was composed of: the *prologue*, stating the situation; the *parodos*, entrance of the chorus with music and dancing into the *orchestra*, in front of and on a lower level than the stage; then the *episodes*, the actual scenes of the play, alternating with the *stasimon* or ode by the chorus separating each scene from the next; finally the *exodus* in the course of which first the actors, then the chorus retired from view.

Roman spectacles often celebrated the triumph of a returning general with the actual troops, chariots, captives by the thousands, as actors. Wrote poet Horace in a first century B.C. bit of theatrical criticism: "For four hours or more the curtain is kept down while squadrons of horse and bodies of foot are seen flying; presently there passes the spectacle of unfortunate kings dragged with hands behind their backs; chariots of every kind and shape hurry along." Complained orator-critic Cicero at the opening of Pompey's Theatre in 55 B.C.: "What pleasure is there in seeing 600 mules in the *Clytemnestra*, or 3000 bowls in *The Trojan Horse*, or infantry and cavalry engaging in battle?" For naval spectacles, special watertight amphitheatres were erected, when the lake was emptied following a mock battle between fleets of triremes, the bodies of drowned slave actors were unceremoniously dragged out and fed to the animals.

Modern Trends. The Elizabethan dramatists developed plays containing an intricate tapestry of incidents, devices, plnts, and subplnts. Examples: in Christopher Marlowe's *The Tragical History of Dr. Faustus* (written about 1589, inspiration of Goethe's *Faust*) the central theme is the idea of damnation; in *Hamlet*, which Shakespeare wrote about ten years later, the idea is revenge; in *Macbeth*, ambition.

In the new drama the playwright laid stress on individual free will: any incident might be crucial, any choice the hero made might decide his fate. Faustus in Marlowe's play has many opportunities to be saved from the consequences of his pact with Mephistopheles; Hamlet shrinks many times from avenging his father's murder; Macbeth wrestles with conscience before each fateful step.

A favorite device of the Elizabethan author was to solve problems by murder, suicide, or fatal combat. Some mortality rates: in Marlowe's *Tamburlaine the Great*, seventeen perish out of a total cast of thirty-two; in John Webster's *The Duchess of Malfi*, eight characters die, 75 per cent of the principals; in Shakespeare's *Titus Andronicus*, thirteen dead and one condemned to death at the play's end; *Hamlet* kills off all its principal characters.

Classic tragedy yielded to realistic drama with Henrik Ibsen (1828-1906) and Dr. Anton Chekhov (1860-1904). Chekhov's strangely static, apparently formless plays of the declining Russian provincial aristocracy were only slowly recognized as masterpieces. Realism progressed to naturalism, the "slice of life" play, e.g., Elmer Rice's *Street Scene* (1929); at about the same time Eugene O'Neill was returning to classic Greek tragedy with his great trilogy of the Agamemnon story set in Puritan New England, *Mourning Becomes Electra* (1931).

Structure. The Roman poet Horace first insisted that a play should be divided into five acts, French Renaissance dramatists adopted this division in their revival of classic forms; Ben Jonson established it in the Elizabethan theatre. With Restoration drama appeared the proscenium curtain, raised after the prologue to signify the play's beginning and lowered after the epilogue for its end, the playwright indicated the end of an act simply by having the actors leave the stage. In the mid-eighteenth century a decorative curtain was lowered to end each act, the actor-manager Sir

Henry Irving in 1880 first lowered it to conceal changes of scene

Organs. In the Greek drama the resolution (*exodus*) had served to get the chorus out of the orchestra, signifying the end of the play; in Shakespeare's theatre it gave time to carry the corpses offstage and for the characters still living to walk off. Playwrights attempted to preserve this structure for years, until Henrik Ibsen finally abolished the artificiality: e.g., in *A Doll's House* Nora goes out and slams the door, leaving the question of what happened afterward for the audience to answer. This technique has since been followed by other playwrights with varying success, the play's anatomy fitted itself to the trend by shrinking from five acts to four in the late nineteenth century, then to three in the early twentieth. But maverick Bernard Shaw wrote *Caesar and Cleopatra* successfully in five acts in 1898, *Saint Joan* without act divisions in six scenes and an epilogue in 1924.

Exposition to inform the audience how matters stand at the play's beginning gave no trouble to Greek playwrights who could open with a soliloquy by a watchman (Aeschylus' *Agamemnon*) or a god (Apollo in Euripides' *Alceste*) or with a dialogue between two characters (in Sophocles' tragedy *Antigone* and her sister discuss their brother's death). The Elizabethans followed suit, Restoration and later comedy writers often made use of servants setting the room in order to dispense information about the principal characters and parts of the plot.

French nineteenth-century dramatist Eugène Scribe devoted his entire first act to exposition, argued that the "well-made play" showed causes followed by effects; twentieth-century Henri Bernstein gave his last act over to exposition, used the diagnostic method of effects-to-causes. Ibsen's technique of gradual dramatic revelation was followed by other writers, from Chekhov to Tennessee Williams.

The device of the flashback as a dramatic form of exposition was invented by Elmer Rice in his first play, *On Trial*, has gone through many adaptations until in Arthur Miller's *Death of a Salesman* the exposition of the past is a secondary theme running parallel with the present.

Movement. The exits and entrances of characters were innocently disposed of by earlier playwrights with such mechanisms

as "See, here he comes now"; in modern plays the circulation of characters requires a built-in rationale, i.e., they cannot enter or leave the stage without a reason other than the playwright's convenience. Even the apparently aimless wanderings on and off stage of Chekhov's characters have their rationale; they are in harmony with the aimless lives the playwright wishes to portray.

Interlocking nervous systems of plot and subplot also gave little trouble in early drama: Shakespeare juggled two and three pairs of lovers at a time in his comedies (cf. *The Merchant of Venice*). Modern sophistication demands subtler interweaving: in Maugham's devastating comment on American peeresses, *Our Betters*, produced in 1923, an elder sister's casual adultery shocks a younger sister into abandoning English high society for simple American morality; conversely in *The Circle* the tragicomic example of an aging pair's decayed *amour* fails to deter a young wife from following the same thorny romantic path.

Psychology. The problem of telling the audience what is going on in a character's mind used to be solved by the Greek chorus, then by soliloquies, e.g., Richard III's detailed advance notice to the audience of the crimes he intends to commit, also by asides.

The realistic play limited the playwright to half-uttered thoughts, sudden confidences from one character to another, or the behavioral method of revealing a character's inner state by outer action; this placed the author at the mercy of the actor's ability to project un verbalized, often mixed, emotions.

The psychoanalytic revolution in the theatre was prophesied by O'Neill's *The Great God Brown* in 1926; in 1929 it burst forth full-blown in self-revealing asides and soliloquies of his nine-act triangle drama *Strange Interlude*. The couch technique was transmuted into music-and-dance dream by George S. Kaufman, Moss Hart, and composer Kurt Weill in *Lady in the Dark*; in T. S. Eliot's *The Cocktail Party* it was literally incarnated in a psychoanalyst with celestial overtones who directed the characters' lives. A return to the Greek chorus was Thornton Wilder's innovation of using characters as commentators in *Our Town*, *The Skin of Our Teeth*, *The Matchmaker*; this technique was adapted with equal success by Tennessee Williams in *The Glass Menagerie*.

Theatre Tricks. Simultaneous scenes, as in the two-story house

of O'Neill's *Desire Under the Elms* (1924), is a form developed as an adaptation to the complicated (and expensive) stage design of the modern theatre, it makes a dramatic virtue out of producers' pleas for plays in a single setting. Reverse adaptation was the play with no setting, e.g., *Our Town* in which playwright Wilder presented life in a New England village from cradle to grave on a bare stage with a few kitchen chairs.

The surprise ending reached a peak of popularity in the first quarter of this century, a peak of dexterity in George M. Cohan's *Seven Keys to Baldpate* (1913). In Roi Cooper Megrue's *Under Cover* (1914) the hero throughout the play is a smuggler, turns out at the end to be a secret service agent.

Summing Up. The anatomy of a play is fairly simple to learn: it is the inspiration that brings a play to life that cannot be taught.

“Half Woman and Half Dream” (*Editorial*)



It is no longer a secret, as the ethnographers have shown, that work as unremitting daily toil is an invention of woman.

In primitive society, man was drawn to hunting in times of peace and to battle in times of war, that is, to enterprise and action, to *discontinuous* sport and adventure. But *continuous* and specialized tasks were the creation of woman, who was the first agriculturist, harvester, ceramist, weaver, and metallurgist.

The highly *public* nature of male psychology drives man, whatever his profession may be, to act all the time on the social stage, with his fellow human beings as audience. In contrast, the *private* nature of female psychology impels woman to view her intimate inner life alone or, at the most, with only the one she loves. Man in history was always a restless and wandering adventurer; woman, the creator of routine and customs.

Until the late Middle Ages woman was conspicuously absent from History. The early Middle Ages was an epoch of great adventures—crusades, tournaments, and pilgrimages—from which woman was excluded; but in the late Middle Ages a feminine star ascended the historical horizon and woman began to exert a profound influence on the ethnic destiny of mankind. From mere servant and slave, she gradually became helpmate and companion

to man. In the love courts of Provence, woman chose as her favorite he who was *prou et courtois*, courageous and courteous, thus creating a male ideal that subsists, though a bit ragged at the edges, to this day. On the male ideal the stone Madonnas on the portals of medieval cathedrals bestowed their gothic smiles, as today, in the physician's office, the dedicated and loyal assistant bestows upon him, her professional ideal, her bright smile.

The salient difference between male and female psychology is that man wants to *know*; woman, to *feel*. Man's mission is to *do*; woman's, to *be*. Man is measured by what he *does*; woman by what she *is*. Man's goal is to attain perfection in science, art, and technology; woman's, to attain the concentric perfection of her being. Consequently, woman's role in the building of society has been peripheral, but in spiritual self-development she has vastly outdone man. Whereas the difference between the quasi-anthropoid who roamed the prehistoric jungles, with barely a spark of intelligence in his brain, and modern man is based mainly on what the latter knows and can do today, between prehistoric and modern woman the difference consists primarily in the latter's great spiritual development as a human being, to which end she throughout history has dedicated her efforts. On the other hand, woman has made history with her personal preferences, choosing neither the strongest nor the wisest male but him who attracted her. Thus she has maintained the male species on a healthy mediocre level, preventing him from sinking back to the level of the anthropoid or rising dangerously to the heights of the archangel.

All this makes it even more remarkable that woman should figure so actively in medicine. There is a woman at the physician's side around the clock, be it his nurse, secretary, assistant, collaborator, or wife. The gentle sex has established a bridgehead in the medical citadel, and every day she strengthens this new historical position. Let the physician welcome this fair invasion, for woman always brings with her qualities that the male lacks, qualities that contribute sensitivity, humaneness, and gentleness, so necessary in medicine.

The second "oldest profession" in the world is nursing, for this is really what the Mesopotamian priestesses did when they comforted and ministered to temple visitors. Medical history abounds

with distinguished women who were nurses: the noble Fabiola who renounced wealth and pomp to attend the poor at the first hospital in Rome, which she founded; the Abbess St. Radegund de Poitiers, daughter and wife of kings, who founded a convent and dedicated her life to nursing lepers; St. Hildegard, Abbess of Bingen on the Rhine, who consecrated her life to medicine; Trotula, Rebecca, Abella, and the other "ladies of Salerno"; St. Clare, founder of the Franciscan order of "Poor Clares"; Elizabeth of Hungary, who was immortalized in paintings showing her carrying a basket of food for the poor that turned miraculously into roses when she was surprised by her irate husband, and who was founder of the "Gray Sisters," thus called because St. Francis of Assisi gave her his threadbare gray cloak; the Dominican St. Catherine of Siena, heroine of the Black Death and patron saint of nurses; and many others down to the lay saints of our times, among whom Florence Nightingale so nobly stands out.

Woman's participation in medicine has changed with the evolution of the profession. In ancient and medieval times, woman's contribution to medicine was taking care of the sick; today she also helps the physician. With diligence, dignity, and authority she labors in offices, hospitals, laboratories, statistical departments, technical auxiliary services, administrative offices, complex communication systems, and many other areas of vital importance to the physician and medical progress. Perhaps in no other profession has woman established herself with as much dignity and authority as in the medical profession.

There is one other woman who makes a vital contribution in the life of the physician—his wife. To marry a physician is to marry a profession, not a man. It is to marry his obligations without his rewards. It is to renounce a wife's rights to a normal regulated life. She may offer him help and inspiration, hope and consolation, but she knows that she will never shine in the hall of honor of medicine. We may applaud the scientific music composed by the physician, but we neglect the muse that inspired it. Her noninterference in his work and duties, her renunciation of everything except sharing his endeavors and their fulfillment and his search for greatness make the physician's wife his most valuable collaborator.

To this modest and invisible helpmate and to the other women in the physician's life whose sensitivity, devotion, and inspiration have contributed the greenest leaves on Medicine's laurel crown of greatness, we render a tribute. To them we say, with the poet Rabindranath Tagore, "Woman, you are half woman and half dream."

“Riches of the Poor”



“Childreo,” says an old Spanish adage, “are the riches of the poor.” But only in fairly recent times has man seemed to place a high valuation on this form of wealth.

Ancient Persians, Arabs, Carthaginians, Phoenicians, and later, the Greeks and Romans, frequently destroyed their offspring. Often poverty-stricken parents killed a child rather than watch it slowly starve. Custom or religious practice often cut short existence, especially that of twins, the deformed, girls, or those born on “unlucky” days.

In Mesopotamia, later in Egypt, infanticide of normal childreo was abandoned. Greek philosophers fully justified the practice, though Hippocrates makes some two hundred references to the sick child. Roman law frowned on infanticide, making it a minor offense, but did not halt it completely.

During the Middle Ages, the all-pervading authority of the Church could do little to help infants and children, though it tried to stamp out abortions and infanticide, discourage abandonments. Archbishop Lathens of Milan established one of the first asylums for abandoned children in A.D. 787. Similar institutions sprang up in other parts of Italy, France, Germany, England, and Spain.

Toward the end of the twelfth century, Pope Innocent III

decreed that infants should be received at Rome's Hospital of the Holy Ghost, ordered authorities not to reveal names of mothers who left children in the institution's care

In 1212 some fifty thousand children set out from Germany and France in the last Crusade. Exposed to Alpine cold, disease, and starvation one group of twenty thousand was reduced to seven thousand by the time it reached Genoa. None ever returned to their homeland. The French group, led by a shepherd boy, dwindled to five thousand by the time it arrived at Marseilles. Unscrupulous traders later sold them as slaves to the Arabs.

Sensitive Souls. Centuries later, St. Vincent de Paul (1576-1660) established many foundling homes in Paris, reorganized one founded by an unknown woman, which grew into the Hospice des Enfants Trouves in 1640, won royal approval from Louis XIV thirty years later.

In England, Captain Thomas Coram, appalled at the sight of hundreds of newborn infants left to die on dunghills, obtained a charter for London's Foundling Hospital in 1741, which opened its door to the first abandoned child in 1741.

To George Armstrong, who founded the "Dispensary for the Infant Poor" (London, 1769), goes credit for the first real step toward the modern children's hospital. But in 1772 he rejected the idea of a children's hospital because, said he, "if you take a sick child from its Parent or Nurse you break its heart immediately."

Despite valiant efforts of a few, foundling institutions could not keep pace with abandonments, continuing at an alarming rate. Jobo Theobald, in *Young Wife's Guide in the Management of her Children* (1764), lamented that "many foundlings" were picked up every day wandering aimless and bewildered in London streets.

According to Hugh Smith (*The Family Physician*), approximately two-thirds of London's children born between 1762 and 1771 died before the age of five, fully three-quarters of these never reached the age of two. In France conditions were no better: one-half the nation's *enfants* died before their second birthday.

Most eighteenth-century authorities blamed high infant mortality on teething. Some blamed "convulsions," another important infant killer. William Buchan (1729-1805) severely criticized maternal

neglect, scathingly denounced poor mothers who hired themselves out to suckle children of the rich instead of nursing their own.

Dr. Joseph Clarke, in 1789, credited improper ventilation with many unnecessary infant deaths, describing how he reduced mortality from tetanus neonatorum at Dublin's Rotunda Hospital with more fresh air, simple hygienic measures, which also lowered deaths from the "nine-day fits" from nine in six to one in 19.3.

In the waning years of the eighteenth century, the *Spectator*, the *London Magazine*, the *Tatler*, other lay publications began exposing the scandalous infant mortality rates, urging better care of the young. Maltreatment of children in crowded, low-ceilinged factories, often leading to epidemics that spread to surrounding countryside and neighboring towns, dramatized the abysmal state of child care, spurred campaigns for improvement.

Pediatric Growth. Although writers from early times dealt with child care and children's diseases, pediatrics did not become a specialized branch of medicine until the nineteenth century, with German physicians taking an early lead. Among the Germans: Otto Heubner (1843-1926), who laid the basis for modern concepts of infant feeding; T. Escherich (1857-1911), discoverer of the colon bacillus, who described changes in the bacterial flora of children during illness.

Among other Europeans: England's Charles West (1816-98), an obstetrician and gynecologist (*Lectures on Diseases of Children*, 1847), helped establish London's Hospital for Sick Children. W. J. Little (1810-94) described the infantile cerebral spastic paralysis now known as Little's disease. Sir Thomas Barlow (1845-1945) described infantile scurvy. In France, pediatrician J. M. Parrot (1839-83) wrote on athrepsia and pseudoparalysis of the newborn, while Henri Roger (1809-91) delivered the first systematic clinical lectures on pediatrics in the country.

In the United States, Abraham Jacobi (1830-1919) pioneered in the study of pediatrics, beginning lectures on the subject at the College of Physicians and Surgeons in 1857, founding the nation's first pediatric clinic three years later. In 1869, J. L. Smith brought out his monumental *Treatise on the Diseases of Infancy and Childhood*, which went through eight editions.

In 1873, the American Medical Association organized a section

on obstetrics and the diseases of woman and children, out of which grew the section on children's diseases six years later. The year 1888 saw the foundation of the American Pediatric Society, dedicated to the study of children's diseases, one of the country's earliest independent organizations of specialists.

In 1900 the average life expectancy of the American child was forty seven years, a gain of some twenty years during the two preceding centuries. The nation's worst child killers included pneumonia and influenza, infectious diarrhea and enteritis, diphtheria, other communicable diseases.

Balance Sheet In the last fifty years, improved sanitation, nutrition, prophylactic and therapeutic measures have all but erased major communicable diseases from United States mortality statistics. Death from diphtheria has fallen by 99 per cent, over all death rate from pneumonia and influenza has plummeted 86 per cent, that for diarrhea and related gastrointestinal disorders by 96 per cent. Whooping cough, meningitis, typhoid, measles, though never among the leading causes of death, have fallen in the same striking manner. Poliomyelitis may be on the way out.

By 1950 the mortality rate (five to fourteen years) had reached the lowest for any age group, falling from 3.9 per 1,000 in 1900 to 0.6, which many consider an "irreducible minimum," since accidents are now by far the main cause of death. If 1900 mortality rates still prevailed, an extra 400,000 infants would die each year.

Infant mortality has declined 80 per cent during the past half century. Most deaths of the newborn now occur among the premature, with injuries at birth accounting for the second highest number. Many infants who formerly would have died before or during birth now survive as premature infants, and further reduction in perinatal mortality (fetal deaths after twenty or more weeks of gestation, plus deaths within the first week of infancy) depends largely on more adequate prenatal care and prevention of prematurity.

Improved surgical techniques now cure or greatly improve many of the most common congenital heart defects, including patent ductus arteriosus, coarctation of the aorta, vascular ring, tetralogy of Fallot, pure pulmonary stenosis, complete transposition of the

great vessels, and pseudotruncus arteriosus, which formerly killed many infants or left them cardiac cripples for life.

Hypoprothrombinemia and associated hemorrhagic disease of the newborn have been greatly reduced with injections in both mother and child of vitamin K or its analogue, menadione. Rickets, which once disfigured many children each year, has become a medical curiosity.

Cerebral palsy, muscular dystrophy, spina bifida, still remain pediatric problems, but better prenatal care seems likely to reduce the total incidence.

Leukemia continues to take a toll of about four thousand young lives yearly. But the acute form, formerly terminal within months of onset, can respond to nitrogen mustard derivatives and folic acid antagonists for several years.

The total spent annually on pediatric research is unknown; joint government-private funds now total nearly \$5.5 million annually, with private industry spending at least an equal amount.

Contrasted with only two generations ago, the future for infant and child health in the United States looks rosy. A devoted corps of 6,567 physicians are pediatricians, an additional 2,156 devote most of their time to child care. The spread of peacetime military training may result in the creation of a new specialty "ephebiatrics" (*ephebos*: Greek for adolescent), suggested by Sir Heneage Ogilvie, Guy's Hospital, London, devoted to medical problems peculiar to the eighteen to twenty-six age group. Practically all approved hospitals now have outpatient clinics able to meet children's special needs, in addition to fifty-four specialized children's hospitals. Even for the poor of the Spanish proverb, medical protection for their riches is at hand.

Fashion and Medicine



*Nature is good but she is not the best here
truly was the victory of Art over Nature*

—Thomas Carlyle (on clothes)

Anatole France once said that if he wanted a complete picture of human society a hundred years after his death, he would choose a fashion magazine, wherein, said he "Their fantasies would tell me more about future humanity than all the philosophers, the novelists, the preachers or the scientists"

At a point in history when female fashions have slipped another somersault, the celebrated French writer's point deserves closer scrutiny At a point also when women's outer clothing was variously dubbed a chemise, trapeze, balloon, or sack, the question arose how far do the new fashions reflect the times?

Since the days when Hippocrates reputedly disapproved of the tight waisting of the women of Cos, relations between fashion and medicine have been uneasy, sometimes erupting into open warfare The waistline is to a fashion designer a mere plaything of the imagination, to the physician it is a vital subdiaphragmatic region affecting most of the body's principal organs and functions At this turning point in costume history, MD peers into the mirror of fashion for a glimpse at its folly and wisdom

Cavalcade. When they fell from innocence, Adam and Eve

made themselves aprons out of fig leaves, to which Jehovah added coats of skins; fashion has revolved around plant fibers and animal pelts since the dawn of history.

Variants of the apron (or kilt) dominated male and female fashions for several thousand years, traceable through the Egyptian, Mesopotamian, and Mediterranean civilizations. One important distinction must be made: throughout many centuries, the recorded changes in fashion affected mainly the rich or ruling classes, leaving the peasantry clad in utilitarian and generally shapeless garments. Thus until the nineteenth century the story of fashion is largely the story of a social class and not of a people.

The summer fashion of the "chemise" or waistless sacklike dress is as old as civilization, appearing in one form or another on the earliest Sumerian and Egyptian figures; the chief difference is that in those archaic times the sack was worn by both men and women.

The development of fashion in the Mediterranean and Near Eastern civilizations during three thousand years of pre-Christian era significantly reflects the differing cultures. The simplicity of Egyptian clothing is in harmony with the stark monolithic geometry of pyramids and temples; the unchanging lines of male and female dress conform with the rigidity of dynastic Egyptian thought.

Contrasting are the opulently embroidered garments of the Babylonian empire, reflecting a turbulent mixture of peoples and a rich mythology. At a period when Egyptian women were still wearing simple straight tunics (c. 700 B.C.), the prophet Isaiah complained bitterly about Judean women with their many changes of apparel, their mantles, wimples, hoods, veils, and the "bravery of their tinkling ornaments about their feet."

The crucial revolution in dress, which was to dominate fashion in the Western world for some 1500 years, occurred in Greece during the early classical period. Discarded were the tight Minoan waists, the elaborate Egyptian wigs, the stiffly ornamented Assyrian gowns.

Men and women now wore simple tunics and cloaks, draped to conform with the body's natural lines. This was also the age of man's transition from magic to reason, from the rigid acceptance of ritual to the natural scepticism of a Socrates. Greek dress was in complete harmony with the architecture of the period, now

generically called "classical," i.e., a combination of balance, proportion, and simplicity.

The second major revolution in fashion, which persists to this day, occurred in the thirteenth century in Europe: the change from the draping to the tailoring style. Clothes were now fitted closer to the body: for the women the new style brought centuries of thoracic compression, for the men it introduced tight fitting hose and equally constricting upper garments.

Individualism exploded during the Renaissance, shattering the feudal system, proliferated in science, medicine, exploration, trade, and travel, evolved a new art, architecture, literature. In dress it produced the most daring fashion in history, the codpiece. Women's retort to this arrogant masculine assertion was the ventral fashion: bosoms were flattened with steel corselets (in Spain, with lead plates) but the belly was accentuated by padding, swelled with the farthingale.

As scientific, economic, and political changes were accelerated, fashion kept pace; after centuries of stalemate, the costume silhouette was revolutionized on the average of every thirty years. Art and medicine collaborated to reveal the human body and its anatomy. Eras of repression and exuberance came in rapid succession, fired by convulsions in the two great fashion capitals, in the seventeenth century in London and the eighteenth century in Paris.

The romantic nineteenth century began with women emulating pale Greek statues in transparent, clinging Empire gowns, proceeded to the mid-century bell shape (with crinoline and hoop skirts), the late century bustle, the turn of the century bean.

Enveloped from chin to toes (by day), corseted, hobble-skirted, hatted, veiled, and sun-shaded through World War I, women in the 1920's achieved votes, careers, bobbed hair, and bare knees at one fell swoop. Increasingly in the three decades since, communications and ready-to-wear have erased class lines, x-ray and psychoanalysis have laid bare both body and soul, anxiety has become the characteristic disease of the era, and fashion as a stress and a release from stress tries on a new look every season, actually buys one every decade.

Sex in Fashion. The masculinity of bifurcated garments is strictly a Western and a comparatively recent notion: in the

Mediterranean civilization both male and female wore skirts; in colder climates, e.g., among the Eskimos and Mongolian peoples, generally both wear trousers; in Japan the traditional garment for both is the kimono. In Europe the differentiation was not marked until the sixteenth century, was not complete until the nineteenth.

England's fashion arbiter, Beau Brummel, set standards of elegance, not masculinity, was himself not at all interested in women. The peak of dandyism was reached in 1772 when a group of young English noblemen returned from the customary Grand Tour of the Continent, set a fashion influenced by Italian nobility, called themselves the Macaroni Club. Their costume: hair dressed with enormous side curls and a large knocker-like protuberance at the back, topping this a tiny hat, which the wearer raised in salute by lifting it with his tasseled cane; a white handkerchief tied in a large bow under the chin, short coat, knee breeches, two or more watches, silk stockings, diamond shoe buckles, a lavish use of cosmetics.

At the end of the eighteenth century came what has been called the "Great Masculine Renunciation": the industrial revolution and the rising middle class set a new standard of prestige for men, that of owning and managing property. Thenceforth man relinquished his claim to personal beauty, contented himself with vicarious consumption, i.e., piling symbols of wealth on his wife, children, and servants. In his sober black and white he became "the very embodiment of life's prose."

Perennial question of whether a woman dresses to attract men or to impress other women is no question to social scientists; in their opinion she does both. Competition both social and sexual is, according to one theory, the "ultimate and essential cause" of fashion.

Erotic areas in the female are more diffuse than in the male, she thus holds the exclusive right to expose more than the face and hands. Women's styles have been described as a succession of fashionable exposures, the female body as composed of zones alternately sterilized and erotic, the sterilized zones being those exposed by the outgoing fashion, the erotic ones those newly revealed by the incoming.

Any area can become eroticized, either by muffling or by ex-

posure, e.g., the napo of the neck among the traditional Japanese, the face among Moslems. Western cultures have alternately muffled and exposed the bosom, belly, buttocks; legs were concealed from view, banned from the language during the Victorian era, then exposed to the knee and higher during the present era.

Technology of Fashion. Mysterious in all eras is how a particular fashion is born, how it catches on, but easy to trace is the source of a fashion once it "takes." In monarchist times a whim, sometimes a defect of royalty was the origin, e.g., William II's court wore long pointed shoes because his favorite, Count Fulk of Anjou, had bunions, Louis XIII covered his baldness with a peruke, Queen Elizabeth took up the ruff because of her long scrawny neck, the tight corset to show off her tiny waist.

Today designers usually win credit for a fashion innovation, e.g., the late Christian Dior and the postwar New Look. But the times must be right; designers' trial balloons go up each season, fizzes are not counted.

First "name" designer was Marie Antoinette's arrogant Mlle Rose, then Charles Frederick Worth, an Englishman, founded the House of Worth, which led the field throughout the nineteenth century, set a precedent for male designers who dominated women's fashions.

Durable Mlle. Gabrielle Chanel became prominent in the 1920's and opened the way for women. Their tendency is to design functional clothes for many-sided living of modern women: the "basic black dress," daytime dresses that double for cocktails and dinner, lounging costumes combining glamor with comfort, town-country suits for suburban wives, "separates" for sports and office. Male designers often capture the headlines with shock tactics; psychoanalyst Edmund Bergler holds that most of them unconsciously hate women, want to make them look ugly.

Earliest fashion news was spread by travelers and at public spectacles such as tournaments: Queen Isabella of France in 1391 initiated a royal custom of exchanging fashion dolls annually. Called "fashion babies," these dolls carried Paris fashions to colonial America.

American buyers flock seasonally to Paris for the couturiers' showings of their collections. If they choose well they will have a

hit, too well and they may have a "Ford," the industry's name for a dress too easily and widely reproduced at low price. Piracy is a perennial problem; designs can be patented but patents are little protection and designers rarely bother to get them. In little time after a showing, diluted versions of the new styles are trundled in open racks along Seventh Avenue in New York through the half-dozen city blocks enclosing the garment center.

Pioneer of the American needle trades, as of American medicine, was Dr. Benjamin Rusb who in 1775 headed a committee to combat the British embargo and produce the first American-made cotton goods. The industry began with men's wear, which by Civil War times had climbed toward \$100 million, while women's wear lagged at \$7 million; \$300 million worth of dry goods were still being made into women's clothes by hand. The dress business soared to first place in the 1920's, today women's apparel is an \$11.5 billion industry, men's \$6.3 billion. Shoes add \$3.9 billion, totting up a \$20 billion clothes bill for Americans to pay each year.

Paris still leads women's fashions, London leads men's, but styles also originate in New York, Rome, California, and Dallas, Texas. American families spend 8.5 per cent of their income on clothes, more than half of it (67.3 per cent) comes from New York. The economic middle class (\$4000 to \$10,000 annual income) is the greatest fashion market, 68 per cent of apparel is bought by 27 per cent of families. Women spend 43 per cent more on clothing than men.

Fashion and Disease. Hippocrates is reported to have chided the ladies of the island of Cos (his reputed birthplace) for compressing their ribs with waistbands and thus interfering with respiration.

Stays and corsets came in for the largest share of medical criticism through the centuries. Ambroise Paré, the great sixteenth-century French surgeon, derided the custom of "mortifying the flesh" with corsets of steel. A century later, another French physician, Jean Riolan, listed some hundred ills linked with the wearing of tight stays, among them spinal curvature, hemorrhoids, bloody flux, displacement of viscera, cancer, miscarriage, and inability to lactate.

In the eighteenth century, a corset might consist of whalebone

stays 6 cm. wide and 1 cm. thick, placed close together and padded; cross-pieces were sewed into the front, which also contained a stay "husk" or iron rod. In the amorous rough-and-tumble of that licentious century, serious injuries were sometimes caused when corset ribs snapped.

First prize in a medical treatise contest was won in 1788 by the well-known anatomist Samuel Thomas Sommering with a work on *The Harmfulness of Laced Bodices*. Support for his views had come a few years earlier from the celebrated Swiss physiologist Albrecht von Haller who once compared the Venus de Medici to a girl deformed by a corset.

Although the corset was modified in the nineteenth century to conform more closely to natural curves, it still drew the ire or scorn of assorted farsighted physicians. Denmark's Rasmussen in 1887 described a frequent finding in autopsies on women of a groove across the anterior surface of the stomach, accompanied by a marked indentation corresponding to the line of pressure of the left rib margin; he postulated that this could be caused by tight lacing.

A brave pioneer was the American Dr. William D. Purple who in 1848 detailed to his local medical society the symptoms that could be attributed to the then fashionable hour-glass figure: hectic flush, palpitation, empty feeling in stomach, painful uterine ligaments, torpid bowels, hemorrhoids, dysuria, prolapse, edema of legs, back pain. Cried he eloquently "It is our duty to expose the folly of fashion. In reply to their complaints we should endeavor to convince them that medicine will have little or no effect unless the cause is removed. We should cry aloud and spare not until the galling bonds of fashion shall cease to drag our ladies in the dust."

During World War I, two clinicians produced x-ray evidence that lesser curvature ulcers were found at the point of maximum narrowing of the waist. Their watchword "Off with the corsets." Roentgenology was also used by many physicians to demonstrate to women the displacement and deformity of internal organs caused by tight lacing.

A significant Danish study showed that whereas in 1900 women accounted for 79 per cent of fresh cases of gastric ulcer, the rate

had dropped to 27 by 1930 after about a decade of corsetless existence.

The most fashionable disease during much of the nineteenth century was chlorosis; at one period it even became the fashion to be as green as a lime. Recent speculation is that the disease might have been caused by anemia from bleeding ulcers, the result of tight bodices.

The tight lacing of Victorian days was also held responsible for a host of respiratory tract diseases, ranging from chronic dyspnea (resulting in fashionable fainting) to tuberculosis. Said the well-known Roberts' *Theory and Practice of Medicine* in 1894: "Whether interference with the respiratory movements, due to pressure of stays or to posture, has any effect in the production of phthisis has been disputed, but it seems very reasonable to suppose that such would be the case." Noted by various medical observers was that some girls fainted when they removed their corsets at night, possibly owing to brusque hyperventilation.

In the early part of the nineteenth century, when women wore the diaphanous Empire dresses in winter or in summer, some physicians branded severe upper respiratory ailments "muslin disease"; an epidemic of influenza in Paris in 1803 discouraged the fashion of near nudity regardless of weather. Toward the end of the same century, physicians deplored women's custom of wearing heavy clothing buttoned up to the neck during the day, then exposing shoulders, bosoms, and arms in evening dress. As some upper garments became thinner at the turn of the century they were dubbed "pneumonia blouses."

Here are a few other landmarks in the unending skirmish between fashion and medicine: in 1908 men were criticized for wearing tight collars, belts instead of suspenders, and excessive clothing; women were warned that their heavy clothing could deform the spine; women's Victorian high heels were held responsible for corns, bunions, and displaced uterus; ill-fitting shoes were also implicated in "mental deteriorations"; in 1925 the *British Medical Journal* noted a rise in the incidence of erythematous legs, attributed to exposure by the skirts of that period; and about the same time a French medical thesis condemned pockets as unsanitary storehouses of germs.

Today, one area in which fashion and medicine still clash is in podiatry. A recent survey of foot specialists in the major American cities disclosed that the latest pointed-toe-stiletto-heel shoes (new fashion in 1958) were causing an increase in the incidence of metatarsal pains and callouses on the ball of the foot, caused by throwing the body weight on the front part of the foot; whereas metatarsalgia (Morton's foot) was an almost forgotten condition, more and more cases were being reported since the new fashion.

Tight girdles required to conform to the slim skirted fashion have also been criticized. Noted Dr. William T. Foley, "The girdles they wear, according to the advertisements, are wonderful for jumping through hoops, posing on one foot, or pushing balloons up to the ceiling. They are designed for women standing up—but not for sitting."

Fashion Fighters. Dress reformers were organized in the last century, called themselves the Rainy Daisies, the No-Crinoline League. Famous shocker was Mrs. Amelia Bloomer, whose costume left women unmoved in 1850, much later became an athletic uniform for girls until the advent of shorts. Physician-zoologist Dr. Gustav Jaeger (1832-1917) believed wool was curative and deodorizing, urged it as the exclusive fabric for clothing including underwear, corsets, boots (except the sole), and handkerchiefs. His sanitary woolen system spread throughout Europe and the United States in the 1870's.

Four women physicians of Boston in 1874 united forces to deliver a course of lectures attacking every aspect of the day's fashions, advocated "doctors of dress" as a new profession. Said one: "The closed drawers that are worn by most women at the present time are extremely unhealthy, inducing a train of evils which cannot be spoken of here, but which seriously deteriorate the health." Their contribution: the "chemiloon," a one-piece suit of flannel underwear with underskirts buttoned to it. Their effect on fashion: nil.

What dress reformers failed to accomplish, medicine achieved by its steady pressure toward emancipation of women from the tabus of the past, e g., attitudes toward maternity and menopause; its encouragement of leisure, sports, hence the development of comfortable casual clothes for both men and women; its campaign

against obesity with consequent improvement of the American silhouette; the extension of life expectancy with the prologation of youth, cutting across old demarcations of status by costume and encouraging youthful fashions for all ages.

Psychology of Fashion. Psychologic paradox of fashion is that "everyone is trying at the same time to be like, and to be unlike, his fellow man." Psychologic lures of fashion are: it offers a change of personality, a mask behind which the individual feels greater freedom, as at a masked ball; women's interest in the body is displaced onto clothes, becomes socially acceptable; men depend on the prestige symbol of dark suit, white shirt, collar, and tie to give them confidence; the "decent discomfort" of conforming to the day's fashion is worth freezing in winter (women) and perspiring in summer (men).

Classified by J. C. Flügel are these psychologic clothes types: (1) rebellious, with strong skin and muscle eroticism, little modesty, little need for protection; (2) resigned; (3) unemotional, those who have mechanized their clothes life. These three derive no conscious satisfaction from clothes. Those who do are: (a) the prudish, who have conquered exhibitionistic tendencies; (b) the dutiful, given to wearing stiff work clothes; (c) the protected, who tend to dress warmly; (d) the supported, who feel strengthened by clothes, particularly tight, stiff apparel; (e) the sublimated, who have transferred narcissism to their clothes (dandies); (f) the self-satisfied, smug "clothes prigs."

Psychology apart, the chemise (sack or bag) dress, which set the female fashion world on its ears, had a practical aspect: it appealed to pregnant women who were tired of the conventional butcher-boy outfits. At a period when the American birth rate is steadily rising, the chemise style seemed to be a natural ecologic phenomenon.

Summing up. James Laver once noted that a fashion ten years before its time is indecent, ten years after its time it is hideous, and after a century it becomes romantic. For physicians the only basic question is whether a fashion is healthy; medicine has played its part in abolishing some of the more outrageous follies of fashion.

Compass and Caduceus



West; nothing to the North, nothing to the South.

—Course Ordered by Columbus

Psychiatrists might have called him obsessive; certainly he was a stubborn man. Christopher Columbus endured neglect and ridicule, scorned opportunities of wealth and ease, eventually destroyed his health in pursuit of a dream. His reward: the discovery of a new world.

Four physicians sailed with Columbus on his first voyage to the New World, several others played important roles in the great adventure. In honor of Columbus, *MD* culls a few notes of medical history.

Old World. The end of the fifteenth century was ripe for great events; century-old ideas were being subjected to challenge and change. Physicians were discarding dogmatic scholasticism for a humanistic approach, geographers were charting tentative maps of unknown seas.

Around the year 1481, one who befriended Columbus was Paolo dal Pozzo Toscanelli, a learned physician and cosmographer of Florence. Dr. Toscanelli had drawn a chart showing a spherical world and a western route to the Indies; a copy of the chart and a

letter from the physician became the principal exhibits when Columbus sought sponsors for his voyage.

Important help also came from Juan Pérez, a monk, and García Fernández, a physician, at Palos, Spain. The monk had access to the Court as a former confessor to Queen Isabella; the physician was a student of geography; working together they helped Columbus obtain a royal audience when he was about to leave Spain in despair after years of frustrating delay. Dr. Fernández served as a courier in the transaction; later he sailed with Columbus, became guardian to the mariner's son.

Columbus' final and most powerful advocate was Queen Isabella of Spain; she did not pawn her jewels as legend avers but she offered to do so in order to put pressure on a dubious King Ferdinand. The King finally yielded, provided two million *maravedía* (about \$14,000) to finance the expedition.

Voyage. Columbus sailed from Palos with three small ships and eighty-eight men: his largest vessel was about 82 feet long and 25 feet wide. Aboard each ship was a surgeon: Maestre Juan Sánchez on the *Santa María*, Maestre Juan Diego on the *Pinta*, Maestre Alonso on the *Niña*. The physician García Fernández was steward on the *Pinta*, in charge of medicines and dressings for the fleet.

Food was cooked in a wooden firebox over a bed of sand; diet was a monotonous fare of hardtack, dried peas, salt meat, or fish doused liberally in olive oil. The men drank wine while supplies lasted, afterwards endured brackish water.

Sanitary facilities were almost nonexistent; fleas, rats, lice, cockroaches, and bedbugs abounded. Toilets consisted of seats hung over the fore and aft rails; a tarred rope end served the function of the traditional American corn-cob. But seamen were as clean as circumstances permitted: at least twice while becalmed they bathed in the ocean and frequently washed their clothes when fresh water became available.

Health remained surprisingly good; late in the voyage, Columbus could write in his diary: "To this day none of my people have suffered headaches, nor been confined to bed with suffering, except an old *dolor de piedra* (pain associated with stones)."

The psychologic stress was great; mutiny was feared as the

voyage stretched into the third month; a false sighting of land only increased the tension. But seventy days after they left Spain, pieces of wood were fished from the water and a branch covered with berries was seen floating by; the admiral noted that "with these signs all of them breathed and were glad." At 2 A.M. the next morning, October 12, 1492, a lookout on the *Niña* sighted land.

Columbus named his first discovery San Salvador; it is generally identified with Watling Island. Five other islands, including Cuba and Hispaniola, were shortly discovered; a fort called La Navidad was built at Hispaniola where the *Santa María* ran aground.

Wrote a jubilant Columbus: "Hispaniola is a marvel. . . . There could be no believing, without seeing, such harbours as there are here, as well as the many and great rivers, and excellent waters, most of which contain gold. . . . The people all go naked, men and women, just as their mothers bring them forth; although some women cover a single place with a leaf of a plant, or a cotton something which they make for that purpose. They have no iron or steel, nor any weapon; nor are they fit thereunto; not because they be not a well-formed people, and of fair stature, but that they are most wonderfully timorous. . . . They are artless and generous with what they have, to such a degree as no one would believe but him who has seen it."

Columbus remained in the islands about three months; in March, 1493, he returned in triumph to Palos after a round trip voyage of 224 days. Despite severe storms and a leaky ship the long passage was completed without loss of a life; it was about the last good fortune the great explorer was to enjoy.

New World. Late in 1493, Columbus sailed with a colonizing expedition of seventeen ships, 1,200 men, the chief medical officer was Dr. Alvarez Chanca, former physician to their Spanish majesties, who gave up a large and lucrative practice to join the fleet.

First shock for the colonizers came when they found La Navidad sacked and its occupants slain; the "wonderfully timorous" natives had risen in wrath at the Spaniards' incessant looting and rape. Among the dead was Maestre Juan Diego, the *Pinta* surgeon, who had remained behind with the original small garrison.

Wrote Dr. Chanca in innocent surprise: "Some of our men went

to the spot where the Spaniards had formerly been; they found the building which they had inhabited, and which they had in some degree fortified with a palisade, burnt and leveled with the ground. The Indians who were seen near the spot looked very shy, and dared not approach, but, on the contrary, fled from them. This appeared strange to us for the admiral had told us that in the former voyage so many came in canoes to see us that there was no keeping them off; as we now saw that they were very suspicious, it gave us a very unfavorable impression."

The Spaniards spent nearly a month looking for a new site suitable for permanent settlement; when finally the colony of Isabella was founded, the men were exhausted and food supplies low; within another week four hundred were ill. Dr. Chanca blamed it on climate and diet; malaria was also a factor.

The heroic labor of the colony's chief physician was commended by Columbus in a letter to the Spanish court: "I will tell your majesties of the work Dr. Chanca has confronted with so many patients, and with the scarcity of supplies, yet even with this he fulfills his duty with diligence and charity."

Dr. Chanca also served as Isabella's official historian, found time to investigate island botany and native customs. He tested new foods on dogs, noted that when colonists imprudently ate one untested fruit "their countenances became inflamed, and such great heat and pain followed, that they seemed to be mad, and were obliged to resort to refrigerants to cure themselves."

On Indian diet, Dr. Chanca noted: "Their food consists of bread, made of the roots of a vegetable, and the *age* (oraje, yam) which is like the turnip and very good food; they use, to season it, a spice called *agí* (*aji*), which they also eat with fish, and such birds as they can catch. . . . They have, besides, a kind of grain like hazel-nuts, very good to eat. They eat all the snakes, and lizards, and spiders, and worms that they find upon the ground; so that, to my fancy, their bestiality is greater than that of any beast upon the face of the earth."

The Spaniards soon encountered the Carib Indians, a warlike and cannibalistic tribe. Reported Dr. Chanca: "We found a vast number of human bones and skulls hung up about the houses, like vessels intended for holding various things. There were few men

to be seen here, and the women informed us that this was in consequence of ten canoes having gone to make an attack upon other islands.

"In their attacks on the neighboring islands, these people take as many of the women as they can, especially the young and beautiful, and keep them as concubines. . . . These women say that the Caribbees use them with such cruelty as would scarcely be believed; and that they eat the children which they bear to them, and only bring up those which they have by their natural wives.

"Such of their male enemies as they can take alive, they bring to their houses to make a feast of them. . . . When they take any boys prisoners, they dismember them, and make use of them until they grow up to manhood, and then when they wish to make a feast they kill and eat them. . . . Three of these boys came fleeing to us thus mutilated."

A legendary tale is that the Caribs once caught and ate a Spanish friar, suffered severe indigestion, thereafter scrupulously avoided anyone in ecclesiastical garb. When the Spanish had to put in for water in Carib territory, they reportedly sent a friar ashore or rigged up a crewman in monkish garments to fool the natives.

The Spanish suffered some casualties in fights with the Caribs; a more serious toll among colonists resulted from their own mismanagement and greed for gold. Parties rushed into the jungle without waiting to provide for food and shelter, dissensions broke out, harsh punishments like flogging and ear slitting were instituted in a vain attempt to restore discipline.

In twenty months the population of Isabella was cut almost in half by death and desertion. So terrible were the tales reaching Spain that the Crown had to offer prison pardons as an inducement to new settlers; even so, only three hundred could be signed up as a replacement force.

Vessels returning from the New World were packed with sick, disgruntled colonists and wretched Indian captives; on one such voyage two hundred and fifty people were squeezed into accommodations meant to hold only fifty; starvation threatened as daily rations were cut to six ounces of bread and a cup of water. Some of the Spaniards wanted to throw the Indians overboard; others suggested borrowing a Carib custom and eating the captives; the

dilemma was fortunately resolved when the winds picked up and the famished survivors reached Europe.

Another fleet returned from Isabella with five hundred slaves crammed into four small ships; about two hundred Indians died on the voyage; half the survivors were sick on arrival. A clerical chronicler at Seville saw the Indians put up for sale "naked as they were born"; he added: "they were not very profitable since almost all died, for the country did not agree with them."

Adding to troubles was a general insurrection of the once peaceful Taino Indians on Hispaniola. Using mounted troops, muskets, and savage dogs, the Spanish massacred the poorly armed natives; by 1496 the Tainos were subdued. An estimated native population of 250,000 was reduced to 50,000 in fifteen years; within fifty years the Tainos were wiped out.

Explorer's Fate. Columbus neglected his colony to seek new discoveries, remained convinced to the end that India or China lay just around the next island. Ironically, he landed once on a peninsula of South America, but thought it was another island.

While exploring off Cuba in 1494 he suffered what was probably a nervous breakdown brought on by lack of sleep, inadequate diet, and exhaustive labor in drenching rains; he may also have suffered from typhus; his symptoms included high fever with alternate delirium and coma. Carried ashore at Isabella, he was restored to momentary health by Dr. Chanca.

Arthritis soon added to the admiral's ills, his eyes became so inflamed on subsequent voyages that sometimes he was nearly blind, he began to suffer delusions, only his stubborn will remained unimpaired. Shipped back to Spain in chains as a scapegoat for colonial failures, he won reinstatement, assembled another fleet for his last and most disastrous expedition.

Shipwrecked on Jamaica, he was marooned for a year, was stricken with malaria, had to contend with treachery among his men. Starvation was avoided by a clever ruse. correctly predicting a lunar eclipse, Columbus convinced the terrified natives that God would blot out the heavens if the Spaniards were not supplied with food.

Throughout the final expedition Columbus quarreled violently with Maestre Bernal, the ship's physician; he wrote once that

Bernal "deserved to be quartered" for insurrection; later he made the probably delusive charge that Bernal "killed two men with medicines in revenge for [something less than] three beans."

In 1504, Columbus returned to Spain for the last time; he was now so ailing and racked with pain that he had to rest for six months before he could summon strength for an appearance at Court to defend his interests. The king offered a handsome cash settlement; Columbus insisted on full restoration of his rights and titles as viceroy and governor of the lands he had discovered; the refusal to compromise cost the old mariner his last chance of rich financial reward. He died a few months later (aged about fifty-three) of arthritis with probable cardiac complications.

Dr. García Fernández remained loyal to Columbus; in a hearing years later to determine sums due to the admiral's estate, the physician testified that Columbus "continually comforted and animated all others in his company" during the fearful first voyage.

Summing Up. The world has forgotten Columbus' failures to honor his one great success; among those who contributed to the New World discovery were some intrepid physicians.

Venus and Aesculapius



Of mankind's maladies, few have had more mystery and romance attached to them than venereal disease, few have caused such passionate discussion in the course of history

Blenorrheal Beginnings. Ancient people were apparently familiar with some of the unwanted fruits of venery, gave good clinical descriptions of gonorrhea. One of the earliest is that of an Egyptian papyrus dating from 3500 B.C., which prescribes plant extracts to soothe painful micturition.

Many believe that the 'issues' mentioned in Leviticus XV refer to gonorrhea; note the distinction made between "issue" and "seed of copulation." The Old Testament enjoined the strictest sanitary measures both for persons having an "issue" and for all persons who come in contact with him or articles he has used.

Hippocrates listed "excesses of the pleasures of Venus" as a possible cause of strangury. From dissections of the urethra he concluded that the pain and pus in many such cases came from tubercles and carnosities, recommended suppuration and free flow of pus as the best cure. Celsus (first century) blamed ulceration of the urinary tract for strangury, as did Galen, who was first to use the term gonorrhea, assuming the emission to be an involuntary loss of semen.

Oviedo (1478-1557), who was in Barcelona when the returning ships put in, supported this view.

The strange disease apparently appeared next in Naples when Charles VIII of France invaded Italy to make good his claim to the crown of Naples. The monarch found the city defended by a band of some two thousand soldiers, among them perhaps two hundred Spaniards, along with wives, concubines, and assorted servants. When Charles took the city, the erstwhile defenders fraternized freely with their conquerors, syphilis laid low thousands of the victors.

In the spring of 1495, Charles and his straggling syphilitics withdrew from Naples; along the route of retreat his mercenaries rallied occasionally to pass on their infection to winsome maids. Whole towns were decimated, terror spread before the sick soldiers. When 148 of the original Swiss contingent of eight thousand neared Berne, the city barred its gates for fear that some harbored the dreaded 'black mangle'.

The syphilitic scourge fanned out through the continent, in 1495 it reached France, Germany, and Switzerland, a year later it appeared in the Netherlands and Greece, by 1497 it was in England and Scotland, two years later it hit Hungary and Russia.

The French quickly dubbed it the "Italian" or "Neapolitan" disease, the Italians reciprocated by terming it the "French disease", Poles called it the 'German disease', Asians called it the "Portuguese disease," following the visit of Vasco da Gama.

After the great pandemic subsided early in the sixteenth century, still unsettled (as it is today) was the question of the origin of syphilis. Modern proponents of the American origin of the malady point to the rarity of clear pre-Columbian references to the disease in Old World literature. They accept the assertions of many Spanish physicians directly or indirectly acquainted with Columbus that the disease came from the West Indies.

The extreme virulence of the disease at first suggests that it was new to the Old World. Corroboratory evidence is a pile of pre-Columbian American bones which apparently show the marks of late syphilis, pre-Columbian Old World bones showing frankly luetic lesions are extremely scarce.

Opponents of the American origin thesis dispute the absence of

syphilitic references in Old World literature before Columbus, argue that numerous diseases (e.g., scabies *grossa*, leprosy, *variola grossa*, scabies *mala*, *böse Blattern*) were most likely, if not always, luetic. Also doubted is the authenticity of early Spanish accounts of the origins of syphilis and the syphilitic nature of the allegedly pre-Columbian American bones. Some authorities assert that there was no actual siege of Naples and that Charles VIII's army breezed through the city on the way south without opposition. Others claim that the great "syphilis pandemic" that followed was not syphilis at all, but most probably typhoid.

About midway between the two schools of thought is the view that syphilis probably existed in some form in Europe before the discovery of America, that Columbus' sailors passed it to the previously uninfected Indians, received it back in more virulent form, and the disease behaved as a new one when reintroduced to Europe.

The historian Karl Sudhoff uncovered an edict from Maximilian I (1495) adopting measures against those who propagated *die bosen Blattern* as well as an ordinance from Paris (1493) threatening all patients with *grosse verole* with expulsion from Paris, as well as two Italian documents (c. 1440) where there is already mentioned the *mal franzoso*.

There is also a retablo by Jaime Huguet still extant in Tarrasa, Spain, delivered by this author in 1461, representing the miracles of St. Cosmas and St. Damien, where, according to historians Lain Entralgo and Peiry, there is a representation of a crural ulcer of undisputable syphilitic origin.

All this and other evidence points, without any question, to the existence in Europe of a mild form of syphilis prior to the return of Columbus.

Therapeutics. Most physicians were well acquainted with the disease by 1520 and understood its venereal transmission. Among the earliest antisyphilitic drugs were purgatives and antitoxics such as *theriacum* and *mithridaticum*; some suggest that mercurial ointment, long used by the Arabs in skin afflictions, also was employed. Introduced early was *lignum vitae* (guaiaecum). Among the first to recommend the "boly wood" was Nicholas Pol, physician to Charles V, who wrote in *De auri morbi Gallici, per lignum Guay-*

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anum libellus (1517) that three thousand Spaniards had been cured by the drug ostensibly used by the Indians.

Mercury, which was to remain the standard treatment for syphilis for four centuries, was suggested by Widmann (1440-1524) as early as 1497, but its use became widespread only after Paracelsus introduced it along with arsenic some decades later.

The modern name of the disease dates from 1520 when Girolamo Fracastoro (1483-1533) published the poem *Syphilis Sive Morbus Gallicus*, recounting the story of the handsome young shepherd (hog-lover) who insulted the god Apollo, received in punishment the dread disease.

After the initial shock of the great pandemic, medical men settled down to serious research into syphilis and other venereal diseases; progress during the next three centuries was steady, if not spectacular. Ambroise Paré (1510-90) introduced the vaginal speculum, observed the indolence of the syphilitic bubo, the induration of the primary syphilitic lesion, and concomitant adenopathy. Fernel (1497-1558) observed in the last year of his life that the syphilitic "virus" had to pass through an erosion in the skin. Fallopius introduced mechanical prophylaxis, differentiated in *De Morbo Gallico* (1563) between syphilitic and nonsyphilitic condylomata.

Morgagni (1682-1772) wrote extensively on syphilis of the internal organs, describing syphilis of the viscera, lungs, bones, and circulatory system, first described syphilis of the cerebral vessels. He also made valuable contributions to the differentiation between syphilis and more localized venereal diseases, describing cystitis, Cowperitis, prostatitis.

road for the next half century. Added Hunterian confusion: he asserted that secondary syphilitic lesions were not infectious.

Refutation of the Hunterian view came in 1804 when Benjamin Bell (1749-1846), among others, reasserted the distinction between syphilis and gonorrhea, as did Swediaur (1748-1824), Horn (1774-1848), and Carmichael (1779-1849). Demonstration of the infectiousness of secondary lesions came in 1835 when William Wallace (1791-1837) showed through clinical experiment the incorrectness of the Hunterian dictum.

Jenner's (1749-1823) experience with smallpox aroused hopes for similar immunologic procedures for syphilis, but all attempts failed.

Philippe Ricord (1800-89), celebrated "French" physician from Baltimore, termed by Holmes the "Voltaire of pelvic literature . . . who would have . . . ordered a course of blue pills for the Vestal Virgins," showed by experiments involving two thousand five hundred inoculations that gonorrheal pus could not cause syphilis, differentiated the three stages of syphilis as they are known in clinical practice today.

Ricord also advocated changes in the treatment for gonorrhea, which had altered little during the three centuries before. He urged an abortive approach, using injections of nitrate of silver, with large doses of copiaba; in the declining stages, he injected zinc sulfate, acetate of lead, and rose water. In especially obstinate cases he introduced pledgets of lint into the urethra to keep the walls separated. But Ricord himself apparently was not altogether satisfied with his stern measures, often remarked to his pupils: "If after I die I should go to Hell, I know what my punishment will be. I should have half a dozen men standing around me, each with his penis in his hand, supplicating me with his prayers and lamentations to cure him of his gleet."

Ricord's disciples Fournier (1832-1915) and Diday (1812-94) carried forward their master's studies with important work on tertiary and congenital syphilis; Fournier was the first to point out the relationship between the "parasyphilitic" *tabes dorsalis* and paresis. Rollet and Clerc cleared away persistent confusion between chancre and chancroid (which term they introduced) by demon-

strating the possibility of mixed infections, involving combinations of syphilis, gonorrhea, and chancroid.

Further confirmation of the distinction between the main venereal triad came in 1879 when Neisser (1855-1914) discovered the specific organism of gonorrhea (*Neisseria gonorrhoeae*), followed in 1889 by Ducrey's (1860-1940) discovery of the bacillus causing chancroid (*Hemophilus ducreyi*).

In 1905 Schaudinn (1871-1906) and Hoffman (born 1868) ended the long search for the causative agent of syphilis with the discovery of *Treponema pallidum*. Thousands of physicians and amateur microscopists throughout the world confirmed the exciting news. That same year Donovan (born 1863) discovered the causative agent of granuloma venereum.

Meanwhile, Paul Ehrlich (1854-1915) was systematically testing various chemicals in search of his "magic bullet," turned up 606 (arsenobenzol or salvarsan) in 1907, which two years later proved a veritable "magic bullet" against treponemas and spirochetes. When syphilis proved refractory to the new compound (it also caused distressing side effects), Ehrlich uncovered another: neoarsphenamine or 614.

Favre and Durand described lymphogranuloma venereum in 1913, although the disease was not widely recognized until positive diagnostic tests were developed in 1925. In 1917 the effectiveness of the albuminates of silver in gonorrhea was recognized.

Until the introduction of penicillin, bismuth and the arsphenamines practically replaced all other compounds in treating syphilis. An important therapeutic adjunct, especially in paresis and other forms of neurosyphilis, was introduced in 1917 when von Jauregg described fever therapy with induced benign malaria.

Post-Penicillin. Introduction of penicillin in syphilotherapy and against gonorrhea converted both diseases into theoretically minor infections; overnight other venereal diseases such as yaws likewise surrendered to the antibiotics.

In 1956, for the first time since penicillin became available, a rise was reported in the national incidence of syphilis. The increase was from 122,075 to 126,219 cases; in 1957 the rate increased further to 135,542.

The same survey estimated that 1,900,000 cases of syphilis

needed treatment last year, and that a million cases of gonorrhea developed in the United States yearly; a considerable number of cases of both diseases were not reported. The U. S. Department of Health, Education, and Welfare has estimated that more than half the total infectious venereal disease cases are among teenagers and young adults.

Summing Up. Venereal disease was dreaded for centuries but the fear was apparently never quite as strong as the temptation; only recently did Aesculapius defeat the menace to Venus.

Scourge of History



In 1956 a retired Navy officer returned from a day's tramp in the woods of Ventura County, California, noticed a pustule on his right ankle. Two days later he suffered chills and fever, diarrhea, a slight lump in his right groin. A shot of penicillin, plus quinine for a suspected recurrence of malaria, gave no relief; he checked into a naval hospital.

The attending physician noted that the pustule looked like a flea bite, found two groups of enlarged lymph nodes. His diagnosis: bubonic plague.

In spite of antibiotics and sulfonamides the officer died, a rare casualty (first in the United States since 1951) of *Pasteurella pestis*, for centuries one of the great scourges of mankind, today practically unknown to a generation of physicians.

Pre-Christian Plague. Biblical mention of what may have been bubonic plague occurs in I Samuel (v and vi): the Philistines in 1320 B.C. "had emerods in their secret parts." Although rats were prevalent in Palestine, some medical historians believe the emerods were actually hemorrhoids, the result of bacillary dysentery.

Greek historian Thucydides (460-400 B.C.) tells in his *Funeral Oration* of the plague in Athens in 430 B.C.; again some authorities believe the disease may have been typhus.

A generally accepted early account of bubonic plague is the brief description by Rufus, physician at Ephesus, c. A.D. 100, who recorded outbreaks in Egypt, Lybia, and Syria during his lifetime and as far back as the third century B.C. Wrote he: "The buboes called pestilential are most fatal . . . accompanied by acute fever, pain and prostration of the whole body, delirium and the appearance of large, hard buboes. . . ."

Justinian's Plague. The first definite historical record of bubonic plague is Procopius' account of the pandemic of A.D. 542, in the sixteenth year of Emperor Justinian's reign. Originating in the port city of Pelusium in Lower Egypt, (about 20 miles from Port Said), the disease spread through the country, then to Palestine, then over the known world, lasted fifty to sixty years, and killed perhaps as many as 100 million people.

Wrote Warnfried: "[The plague] depopulated towns, turned the country into a desert and made the habitation of men to become the haunts of wild beasts." Another historian declared the severity of Justinian's plague was the major factor that brought on the Dark Ages.

Symptoms, according to Procopius, were sudden slight fever, then buboes in the groin, armpits, behind the ears. Some victims became lethargic and perished for lack of food; others went into delirium.

Those in whom the buboes swelled and filled with pus recovered, said Procopius, because "the violence of the carbuncle had grown less and passed into pus . . . and experience teaches us that this is a sign of recovering health." In *A Treatise On Plague*, Dr. W. J. Simpson noted that the large size and suppuration of the bubo indicated a mild attack, the reverse a severe illness.

Worst hit was Constantinople, center of the government and of the civilization of its day. At the height of the epidemic (about three months) 10,000 persons died daily. Burial of the dead became a problem: victims were buried in mass graves, between tower walls (with a resulting stench), or dumped into the sea.

The people of Constantinople put aside their religious and political differences and made common cause against the disease, to little avail. Business came to a halt as craftsmen deserted their shops; famine spread when farmers died or fled their farms.

Whether domestic rodents played a part is debatable; some historians claim that rats were not imported into Europe until the twelfth century (via the returning Crusaders), and that inter-human transmission played the predominant role, i.e., the pneumonic form of bubonic plague, transmitted by droplets.

Black Death. The great plague came from China about the year 1338, traveled the caravan routes across India, over the deserts to Egypt in 1347. It went by another route to the Black Sea and Constantinople, and arrived at the ports of Sicily, Italy, and Southern France in 1348. It spread like a prairie fire over Western Europe, Holland, Germany, and England, reached Poland and Sweden in 1349, Russia in 1351. It even hit Greenland, thereby, say some historians, changing the history of North America by devastating a community already in touch with the American continent.

In its worst form, the Black Death lasted only two years, but the statistics are staggering: Cairo lost ten to fifteen thousand people daily; 60,000 died in Florence; 50,000 in Paris; 70,000 in London (the Chancellor of Oxford reported the population was reduced from thirty thousand to six thousand). In parts of Germany, the death rate was 90 per cent; the total mortality throughout Europe was twenty-five million (about 25 per cent of the population), and probably another twenty-five million in China and India.

The Black Death was attributed to God's anger at the wickedness of the age, to planetary influences, to "thick, stinking mists in the air." Neither physician nor layman thought about the rats that fed on garbage thrown from windows in the filthy fourteenth-century towns and cities, nor of the fleas that fed contentedly on the unwashed population. Inflamed boils and swellings appeared in groins and armpits, and the dread black spots (hence the name, Black Death) were usually accompanied by vomiting of blood. Surgeon Guy de Chauliac, physician to Pope Clement VI, thus described the plague in Avignon in 1348:

"The disease began in January and lasted seven months. It presented itself in two forms. The first lasted two months with continued fever and the spitting of blood. The second lasted for the remainder of the time, also with a continuous fever and abscesses and carbuncles on the external parts, chiefly in the groin

and the axillae . . . the patients died in five days. So contagious was the disease that no one could approach or even see a patient without taking the disease. The father did not visit the son nor the son the father. Charity was dead and hope abandoned."

Remedies were numerous, but mostly preposterous. For self-preservation, learned physicians prescribed purging with pills of aloes, advised against exercise and cold, moist food; declared olive oil, poultry, and vegetables fatal; forbade political arguments, marriage, and sexual intercourse.

Recommended treatments included bleeding, cautery of the boils, evacuation. External swellings were softened with figs and cooked onions mixed with yeast and butter, then opened and treated as ulcers. Patients were also urged to stand over a latrine for hours and inhale the stench.

The Medical Faculty of the University of Paris recommended kindling fires of odoriferous wood to dispel the poisons in the air, also the wearing of garlands of thyme and rosemary.

Terror. As the plague spread, terror seized the cities. People fled to the country, but death went with them. Livestock and human beings usually lived under one roof and the rat-flea-human relationship was as inexorable as in the towns. So many farmers died of the disease that the cities' food supply began to diminish. Unattended herds of cattle wandered through the countryside.

Burials overflowed from churchyards to huge mass graves dug outside the towns. The Pope blessed the Rhône so that the dead could be thrown in consecrated water.

A rumor began in Switzerland that the plague was caused by Jews poisoning the wells. A Jew was arrested, tortured on the rack, "confessed" to an organized plot to poison wells and streams.

The fabrication spread, resulted in widespread persecution. Jews were murdered, burned alive, in spite of the Pope's efforts to halt the massacres. Meanwhile, the "polluted" wells were sealed and the people drank water from rivers into which the dead had been thrown.

Nearly half the clergy died of the plague. Some fled their parishes, or refused to remain except for double pay. Others were heroic; the mendicant orders, the Franciscan and Dominican friars, labored valiantly to tend the sick. In the Hôtel Dieu in Paris, where

patients died at the rate of five hundred a day, the staff of the Sisters of Charity was decimated several times.

In many parishes without clerics, queer cults arose: devil-worshippers, the order of Flagellants, who marched from town to town scourging themselves with whips. Later these groups often degenerated into marauding hands that looted houses and stores and robbed the sick.

As the plague continued its terrifying devastation, families broke up when a member fell sick and the rest fled. City administration disintegrated, law courts were emptied; property rights were ignored. Shops and houses stood deserted until rovers moved in and took possession. Promiscuity became common; historians record an increase of "unnatural forms of vice."

The most famous description of the plague is Boccaccio's preface to his *Decameron*, a lurid picture of the physical and psychologic reaction in the city of Florence:

"When the evil had become universal, the hearts of all the people were closed to feelings of humanity. They fled from the sick . . . hoping by these means to save themselves. Some shut themselves up in their houses with their wives, children and household, living on the most costly food but carefully avoiding excesses. . . . Others on the contrary, considered eating and drinking to excess, amusements of all description, the indulgence of every desire and an indifference to what was passing around them as the best medicine and acted accordingly. They wandered day and night from one tavern to another, feasting without moderation.

"Amid this general lamentation and woe the influence and authority of every law, human and divine, vanished . . . henceforth everyone acted as he thought proper. Instead of sorrow and mourning appeared indifference, frivolity and mirth, this being considered, especially by the females, as conducive to health.

"Among the middle classes, and even more among the poor, the misery was still greater. Poverty or negligence induced most of these to remain in their dwellings . . . and thus they fell by thousands, many ending their lives in the streets. . . . The survivors, to preserve themselves from infection, had the bodies taken out of their houses and laid before the doors, where the early morn

found them in heaps, exposed to the affrighted gaze of the passing stranger."

The bubonic plague hit England perhaps harder than any other country, killing more than half the population. It first appeared at Weymouth in July, 1348, when a ship docked with its deadly cargo of rats. It spread to Bristol, wiping out almost the entire town, and reached London in the winter. Some 100,000 died; 50,000 corpses were buried in a charnel house improvised on the site of the present Charterhouse Square.

Scotland gloated over its enemy's plight for a time, then became infected when a Scottish army invaded England: the returning soldiers brought home the disease.

Ghost ships sailed the seas, with every passenger and crewman dead. One such ship, with a cargo of wool from London, appeared off Bergen. The Norwegian authorities boarded the vessel, carried fleas ashore, touched off another plague spot.

As the plague went into its second year, famine became widespread; occasional cases of cannibalism were reported. Morals further disintegrated; despair was universal. For every person who turned to the Church for solace, another embraced a kind of mirthless frivolity. And in the wake of the plague came outbreaks of influenza, scurvy, the dancing madness. Europe became an "abyss of horror."

Just when the disease in Italy seemed to be abating in 1350, the faithful were summoned to Rome for the jubilee year; there was a fresh eruption, and one historian estimated that not one in a hundred survived.

Aftermath. After two years, the Black Death ended almost as suddenly as it had begun, leaving the populace in a state of collective shock. The after effects were powerful and far reaching, some good, some bad. The crackpot cults continued to attract adherents; mind readers, fortune tellers, and astrologers enjoyed a great vogue; witchcraft became a popular delusion.

A new gentry appeared; those who had appropriated houses and estates. Property rights were entangled, with many large estates in litigation, and the number of lawyers increased. Many of the *nouveaux riches* wanted to learn the manners of gentlemen: there was a boom in books of etiquette.

Beneficial result of the plague in Italy was the adoption of plans for medico-municipal action in times of crisis. In 1347 Venice became the first city to forbid entry to travelers who might be infected; later the republic of Ragusa established a quarantine system: sailors and cargoes from plague areas were detained for forty days on a nearby island. Throughout Italy, measures were established for airing homes, disposing of clothes of infected persons, and controlling water supplies.

Probably the greatest change brought about by the Black Death was the virtual end of the feudal system. Laborers had been serfs, tilling the lords' estates. Now they were scarce, and competition among the proprietors for their services was strong; in spite of royal decrees commanding the serfs to remain in bondage, they demanded and won both freedom and higher wages. In 1388 came the Peasants' Revolt in England, and eventually the landlords had to abandon the old system of forced labor. Thus the Black Death gave rise to the sturdy yeomen of England, hastened the end of feudalism.

17th Century Plague. After a breathing spell of three centuries, the pestilence returned to Europe with the greatest violence since the days of the Black Death. Italy was hit in 1629-31; 86,000 died in Milan and an estimated half-million in the Venetian Republic, an important factor in the subsequent decline of Venice.

The pestilence spread to Holland and Germany, decimated eastern Europe in 1654-56, also turned west and crossed the English Channel.

London. When two men died in London in December, 1664, two physicians and a surgeon publicly declared the cause of death to be bubonic plague, and the panic was on. By summer, the disease was spreading rapidly, and the roads out of London were choked with the rich fleeing the pestilence. The King's court fled to Oxford in June, showed concern for the public by prohibiting plays, gaming, dancing, and musical entertainments.

A vivid account of the London plague is Daniel Defoe's *A Journal of the Plague Year*, published in 1722.

Defoe chronicles the psychologic reactions: the great number of quacks and quack cures, the fortunetellers, the servants who

feared they would be abandoned when their masters fled to the country; many were in fact left to starve.

Remedies were little better than those of the fourteenth century. The College of Physicians published directions for cheap preventives and concocted an anti-plague liquid, but physicians themselves were not immune; they died, said Defoe, "with their preservatives in their mouths." Some physicians wore long gloves and a prophylactic mask, with a leather beak holding antiseptics.

Authorities ordered a quarantine of all houses containing victims of the disease, thus insuring the infection of the other inhabitants; also recommended keeping windows tightly closed and plugging cracks and keyholes to keep out the "miasmatic air." Result: whole blocks and sections of the city were wiped out.

Dogs and cats were killed by the thousands, but rats were ignored. Buboes were kept open by blisters to let the "peccant humors" escape. Sufferers were awakened every four hours, as sleep was deemed fatal. Defoe also wrote that physicians applied violent drawing plasters to the swellings and burnt them with caustics "so that many died raving mad with the torment."

As in previous plague, civil authority broke down; crime of all kind increased; the city became demoralized. People grew weary of precautions and remedies that had no effect, gave themselves up to despair.

Some 68,000 people, one-sixth of the London population, had perished by the end of 1665, then the incidence rapidly diminished; the next year saw less than two thousand cases.

Plague's End. Final flare-up of the disease occurred in Europe in 1720, when 40,000 to 60,000 people died in Marseilles. That brought the devastating pandemics to a close.

The last epidemic of global significance originated in China in 1894 through the port of Hong Kong, passing to India in 1896, then to the Philippines, West Africa, also to Russia and parts of Europe, finally to Central America, Mexico, and the west and gulf coasts of the United States.

Discovery. Also in 1894 came the simultaneous discovery of *Pasteurella pestis* by Japanese physician Shibasaburo Kitasato (1856-1931) and Swiss bacteriologist Alexandre Yersin (1863-1943), while investigating diphtheria in Hong Kong.

Today the rod-shaped bacterium that killed hundreds of millions is no longer an epidemic threat, although a permanent plague area exists in fifteen western states and in western Canada and Mexico. Sylvatic plague is present in wild rodents, ground squirrels, wood rats, prairie dogs, rabbits, chipmunks, and marmots.

The U.S. Public Health Service advises West Coast physicians to be constantly on the alert, be suspicious of swollen lymph nodes, treat possible exposure cases quickly, especially since it is now known that a flea bite is not a prerequisite: bubonic plague can be contracted by the flea's vomit or feces being rubbed into the skin. Treatment of choice is streptomycin and sulfadiazine; both have reduced mortality to less than 10 per cent.

The incidence of bubonic plague has declined substantially in recent years, especially in Asia, the permanent home of the infection. The World Health Organization reported a total of 514 plague deaths in the free world in 1957. Burma had the worst record, with 198 cases; in the Americas, Ecuador led with 72. There was one probable but unconfirmed case in Texas.

Summing Up. Medical knowledge broke the deadly triangle that carried *Pasteurella pestis* from rat to flea to man; bubonic plague is an ever present but minor threat to world health.

Love and Medicine



*Love rules the court, the camp, the grove,
And men below, and saints above;
For love is heaven, and heaven is love.*

—Sir Walter Scott
The Lay of the Last Minstrel

It could be said of love that everyone talks about it but no one knows much about it. It is an emotion that has inspired artists and baffled scientists. It is also a psychic phenomenon that defies analysis, a potent component of health and illness that has no place in any medical textbook.

Although the physician of today is rarely called on to treat a patient for a "broken heart," this elusive clinical entity still appears in the guise of mysterious psychosomatic ills. The need to love and to be loved remains a basic factor in the human personality. In an attempt to throw a little light on an age-old mystery, *MD* here presents random jottings from the story of love.

Early Period. The remotest origins of love might be traced to the tendency of all particles of matter to establish an integrative relationship. A free electron seeks out an atomic structure into which it can fit itself, molecules coalesce to form a pattern, radicals search for molecular chains to which they can become attached.

Aristophanes in Plato's *Symposium* tells how Zeus cut man in two, since when the two halves of mankind have ever sought to

come together again: the desire and pursuit of the whole being called love. Biologic counterpart to this myth is the mitosis of single-celled organisms, endlessly reproducing the primordial protoplasm.

It is certain that the biologic basis for love between male and female existed long before the notion of love emerged into consciousness. The higher primates form attachments that show every evidence of close emotional ties. Among the most primitive peoples extant, such as the Andamoa Islanders and the Negritos of Luzon, men and women form lifelong monogamous unions.

At what stage the relationship between a man and a woman acquired a name and an abstract quality is not known. About 3000 years ago a love-stricken Egyptian recorded on a stone tablet that he was sick and the master physicians could not cure him. Lamented he:

*Better for me is my beloved than any remedies;
When I see her, then I am well.
When she opens her eyes, my limbs are young again;
When she speaks, I am strong,
And when I embrace her she banishes evil
And it passes from me for seven days.*

The oldest love story in the Bible (possibly 1000 B.C.) is that of Jacob and Rachel, the most passionate is the adulterous love of David for Bathsheba. Their son Solomon left a powerful imprint on the Judaeo-Christian concept of love in the *Song*, flowing with Oriental imagery and sensuousness.

The early Greeks were the first to discuss and rationalize the nature of love. Homer's Helen saw nothing remarkable in eloping with the handsome Paris, then returning to her husband when he had won the Trojan war. Clytemnestra betrayed her husband Agamemnon while he was away at the wars, then plotted with her lover to kill him. Aphrodite, the Greek goddess of love, was supposedly married to Hephaestus but she generously bestowed her favors on Ares, the god of war, on Anchises, and on Dionysus. Against this loose conduct, Penelope remained faithful to Ulysses, while that wanderer philandered with sundry nymphs in his travels.

Every educated Greek in Plato's time was familiar with the touching story of Alcestis who laid down her life to ransom her husband Admetus from death; as a reward she was brought back from the lower world and restored to her husband. Equally familiar was the story of Orpheus who braved the terrors of Hades to find his dead wife Eurydice.

The Greek concept of love at about the time of Socrates was divided. An Athenian married for money or social position, marriage for love would have appeared ludicrous. Women were supposed to be faithful, but the men could keep concubines.

The closest companion of an Athenian was usually a hetaira, a beautiful and cultivated courtesan. In Socrates' time (fifth century B.C.), the leading Athenian statesman Pericles divorced his wife to marry the brilliant courtesan Aspasia. But passionate love for a hetaira was considered extremely bad taste; passion itself was regarded as an illness.

Above physical love, the Greeks placed a higher form of love in which human beings (regardless of sex) were united in an eternal love of Good and Beauty. This Platonic love borrowed heavily from the mysticism of some Asian religions.

The Romans took over from the Greeks the double standard of morality: married men could love other women but married women must preserve their honor. New element in the mores was the appearance of passionate love, exemplified in the overwhelming love of the legendary Dido for Aeneas. When she met him she was tongue-tied, when he was away, she lay on his couch and longed for him. When he abandoned her, she destroyed herself on a funeral pyre.

By the time Marc Antony met Cleopatra (42 B.C.), the notion was well established in the Roman world that love between a man and a woman could be such an overwhelming force that all else must bow before it. The Greek philosophers' concept of an ideal love was lost in the cynical licentiousness of the Empire.

After the dissolution of the Roman world, Europeans were exposed to three forces: barbarian tradition, Christianity, Oriental mysticism, all three left a mark on the notion of love.

The Celts had no strong feelings about love, nor did their Druidic pantheon of gods and demons include a god or goddess of

love. The early Irish mythology contained women endowed with eternal youth and beauty who would occasionally woo a mortal man. In the Cuchulainn cycle, the love motive was usually brutal lust, though a form of idyllic love ran through the story of Deirdre and Naoise. In the Welsh barbaric romances, the element of love (heavily mixed with magic) took the shape of woman worship.

Christianity's contribution to love was a mixed blessing. On the one hand it taught equality between the sexes and elevated the status of women, on the other hand it introduced the element of sin into love, absent in paganism. Love now acquired the duality of sacred and profane love.

Middle Period. On a fateful day in 1118, a young French philosopher named Pierre Abélard met and loved the beautiful and intelligent Héloïse, unknowingly laying the foundation of a vast revolution in morals and manners that still echoes today. The unfortunate pair were the first passionate lovers in a Europe that was just emerging from the Dark Ages. In that twelfth century was founded romantic love.

The first requisite of courtly love in the twelfth and thirteenth centuries was that it must be Platonic and unhappy. A knight loved either a virgin or (more frequently) another man's wife. A woman was thus idealized, placed far above the dross of physical contact.

In draughty castles, ladies and their knights gathered in Courts of Love to discuss the finer aspects of love. In one "judgment," delivered in the house of the Countess of Champagne in 1174, it was laid down that love and marriage were incompatible.

Troubadours sang of love as conferring a dignity, an exaltation. They propagated the Laws of Love, which were moderation, service, prowess, long expectation, chastity, secrecy, and pity; those virtues led to joy, which was a sign of *vray amor*. Sang one: "Ah! noble Love, source of goodness, by whom the whole world is lit up, I cry unto thee pity." And another extolled the virtues of a lady fair whom he had never met.

During the Middle Ages, the concept of courtly love underwent a few earthy changes, probably from being mixed with a few Celtic stories. The love of Tristan and Isolde is beset with obstacles and ends tragically, but in the course of it the two lovers manage to have sexual relations.

In the Arthurian legend, the pursuit of the Holy Grail is accompanied by involved *amours*: Elaine of Astolat's love for Sir Launcelot is unrequited, while the other Elaine's love for the same knight produced Sir Galahad; meanwhile Sir Launcelot also carried on an adulterous affair with King Arthur's queen Guinevere, and the great court magician Merlin openly kept a mistress.

The Renaissance restored to the relations between men and women much of the sensuousness that had been buried under a heap of chivalric romances; Cervantes' gallant knight Don Quixote (1605) helped to destroy with laughter most of these tales.

Yet the artificial forms and rituals of love persisted for a few more decades, particularly among the French aristocracy and *haute bourgeoisie*. Women pored over "maps of love," gallants were expected to do their wooing with rhetoric, allegory, and delicate roundabout phrases. The masterpiece of the period, Honoré d'Urfé's five-volume novel *Astrée* set the tone of French preciosity that was ridiculed contemporaneously by Molière.

Protestantism, especially in its English Puritan form, left a stamp on the concept of love that persists to this day. The early Christian notion of sin associated with love between man and woman was revived and made part of the mores of the seventeenth-century middle class. Its strictest forms flourished in the American colonies, where the boisterous bawdiness of the Restoration in England did not penetrate to restore a wholesome balance.

Modern Period. The dark veil of melancholy that shrouded love for so many centuries was ripped into shreds in the eighteenth century. During the first decades of this century, the earlier posturings and complaints of unhappy love were laughed out of court.

Men and women now plunged recklessly into "affairs of the heart," treating love as an elegant pastime. Complained the Abbé Galiani: "The women of our time do not love with the heart; they love with the head."

In place of the unhappy Tristan or Launcelot, the eighteenth century set up the prototype of Don Juan. Whereas woman had once been the ideal symbol of love, she now became a mere instrument of pleasure. Here is the Goncourt brothers' description of the eighteenth-century woman:

"Instead of giving her the satisfactions of sensual love and

settling her down to voluptuousness, love fills her with anxieties, drives her from one trial to another, from one attempt to another, shaking in front of her as she goes step by step into shame the temptation of spiritual corruptions, a falsehood about ideals, the elusive caprice of dreams of debauchery."

Lighthearted love flourished for several decades, but it appeared to lack certain elements that had made the earlier romances powerfully attractive. First to break through into greener pastures was Jean Jacques Rousseau with his lovers in *La Nouvelle Héloïse*. The hero Saint-Preux obtains the favors of Julie but is immediately beset by doubt. Writes he: "No, it is not those transports that I most regret. Ah, no! Take away if you must those intoxicating favors for which I would lay down my life a thousand times, but give me back everything else, all that has a thousand times obliterated them. Give me back that close union of soul."

The stage was set for the next turning point in the history of love: romanticism. Goethe's tear-drenched story of the sorrows of young Werther (1774) plunged Europeans into an orgy of morbid sensibility, obliterating the brash sensuality of a Casanova in a vapor of sighs. It also touched off a wave of suicides for love.

The growth of romantic love during a period when Europe was being politically torn to pieces is one of the neater paradoxes in the history of love. Under the impulse of the German romanticists (Holderlin, Tieck), love was once more enthroned as an exalted emotion before which all else must bow.

of supreme fulfillment. And although love occasionally led to marriage, more often it led to misery and suicide.

In this wild stage, love was considered the highest force in human conduct, higher than honor, duty, patriotism. The period lasted about half a century, until romanticism was tamed by Victorian respectability and degenerated into sentimentality. But even at the height of Victorianism, a Charles Parnell could ruin his brilliant political career for the love of Kitty O'Shea, an action that would have greatly astonished Plato.

Toward the end of the nineteenth century there was a transient revival of morbid interest in medieval love patterns, abetted by pseudo-Gothic architecture and pre-Raphaelite paintings. The old theme of the *belle dame sans merci* expressed itself in sickly romantic poetry of the *fin de siècle* hothouse variety.

All that was scattered to the four winds by World War I. In the twenties, the following confused picture of love emerged: (a) the semiliterate masses clung to the romantic love story, in popular magazines and films; (b) the sophisticated plunged into a hedonistic Graeco-Roman approach of frank sexuality and contempt for mawkish sentimentality; (c) the popular music of the period (blues and torch songs) moaned of frustrated or unrequited love.

The situation in the Anglo-Saxon world today appears to be stabilized on a plateau of what might be called realistic romanticism. The licentiousness of the between-wars period is no longer in fashion, neither is sickly sentimentality. Relations between the sexes are frank, uninhibited, on a footing of equality. Strongest element in youthful love, reported from campuses, would seem to be companionship.

An over-all view of how the concept of love has developed through the centuries reveals this: love is a balance between physical and mental-emotional factors that refuses to remain disrupted for long. The pagan overemphasis on sensuality was not sufficient, it had to be counterbalanced by a mystic element. The medieval denial of sensuality and the exaggerated emotionalization of love left a void that was later filled by the sensuousness of the Renaissance. The strait-jacketed Puritan concept of love made little headway anywhere. The coldly rational approach of the eighteenth century lasted only a few decades, was followed by an

explosion of wild romanticism. Victorian sentimentality gave way to oaked sexuality in the first decades of this century, which in turn was found to be unsatisfactory.

At every turn of love's history any exaggerated emphasis on one of its elements brought a reaction, then a counterreaction, all moiling in an uoending struggle to maintain an even keel. Woman passed through the stages of being a chattel, a mystic image, an instrument of pleasure, a romantic wraith, a sexual partner, an hoorable companioo. Men have in turn ignored, worshiped, idealized, and brutalized women. Empires have been lost in the name of love, families have beeo destroyed, fame has been tarnished, lives have been sacrificed. In short:

*Love:—what a volume in a word, an ocean in a tear,
A seventh heaven in a glance, a whirlwind in a sigh,
The lightning in a touch, a millennium in a moment.*

Definition. A warniog to all would be analysts of love is that few psychologists have been brave enough to uodertake a definition of the emotioo in scientific terms. A curious fact is that in scores of learned treatises oo marriage, the family, or sex, the term love is not even indexed.

Back in 1822, author Henri Stendhal tried to break love down into its componeots (*De l'Amour*). He defined four kinds of love: passion-love, sympathy-love, sensual-love, vanity-love. Only the first was valid and he tried to explain it by his ingenious "crystalization" theory.

Empiric observations of men and womeco in love reveal these common denominators:

(a) a feeling of mutual tenderness and affection, aod a deep sense of pleasure in experiencing such a feeling (providing that the course of love runs smoothly);

(b) the loved one is perceived as desirable: either beautiful, good, or attractive;

(c) perception is narrowed and focused on the loved person, excluding other people and frequently leaving many character traits unnoticed;

(d) there is sweet pleasure in being together, in sharing as

many experiences as possible; frequently noted is that a shared experience is pleasanter than one experienced alone;

(e) there is a strong desire for intimacy between lovers, both physical and psychologic, often expressed in a yearning to know as much as possible about one another;

(f) a feeling of generosity, of wanting to give and to afford pleasure.

The element of sexual arousal is reported to play only a secondary role in love, inasmuch as love as defined above can and does exist in persons who are too old for intercourse. Noted by some is that the enjoyment of sex relations tends to improve as love grows stronger.

A salient feature of well-adjusted lovers is that they grow in honesty in their relationship, tend to "drop defenses" that are part of every individual's protection against the outside world.

Contrary to the Stendhal crystallization theory, a normal love relationship does not perpetuate perceptive blindness; on the contrary, love partners come to see one another with all their physical and psychologic shortcomings, yet continue to love. Noted A. H. Maslow (Brandeis University):

"One of the deepest satisfactions coming from the healthy love relationship reported by my subjects is that such a relationship permits the greatest spontaneity, the greatest naturalness, the greatest dropping of defenses and protection against threat. In such a relationship it is not necessary to be guarded, to conceal, to try to impress, to feel tense, to watch one's words or actions, to suppress or repress. My people report that they can be themselves without feeling that there are demands or expectations upon them; they can feel psychologically (as well as physically) naked and still feel loved and wanted and secure."

Another powerful element in the love relationship is reported to be the ability of love to transcend the ego of each individual. Granted that every human being is psychically encapsulated and isolated from other humans, the love relationship frequently takes the form of what poet Rainer Maria Rilke called the effort of "two solitudes to protect, and touch and greet each other."

Contrasted with each individual's tendency toward autonomy

is what Angyal called "heteronomy," or the attempt made by a human being to reach out beyond the limits of the ego. This manifests itself in altruism and patriotism, it can equally be realized in a love relationship. Persons deprived of a healthy outlet for this "heteronomous" tendency are reported to be more prone to psychic ills.

Physiology. Poets and artists have described the physiology of love far beyond the power of scientists to add or detract. An odd empiric observation is that love is frequently preceded by a generalized feeling of boredom or loneliness, an ill-defined restlessness, as in Romeo's "troubled mind" before he sees Juliet.

For some psychologists, this uneasy mood is caused by a sense of personal inadequacy, of dissatisfaction with the self. The ego appears to be seeking some field in which it can expand, to reach beyond the limits of the isolated personality.

The physical symptoms of a person who falls in love are characteristic but physiologically inexplicable. The senses become sharpened, the circulation is quickened, muscular tonus appears to be increased. The sensation of lovers of "walking on air" is a musculo-skeletal change reported at all times and in many different cultures.

One common symptom is that lovers suddenly develop a profound benevolence toward other people. Everyone in the environment appears more friendly, more worthy. Petty jealousies are forgotten, new virtues are discovered in old companions. The old adage that all the world loves a lover could equally be turned as "a lover loves all the world." An endocrine explanation for this phenomenon has not yet been produced.

Whatever the physiology, every physician who is in contact with common psychosomatic ills knows that the frustrated desire to love and to be loved is a potent source of psychic disturbances. Dryden might note that "to cure the pains of love no plant avails; and his own physic the physician fails," but all the so-called torments of love are far less dangerous than the bleakness of a loveless life.

From this fragmentary study of the history and etiology of love, one comforting fact emerges: the concept of love has passed

through many changes as the human psyche developed through the centuries, *but in one form or another it has inspired human beings to seek after truth, beauty, and a form of immortality*

Sex Merchant



I regret nothing.

—Casanova (*Age 73*)

Synonymous with amorous escapades is the name of Giovanni Jacopo Casanova de Seingalt. His *Mémoires* mention more than one hundred mistresses by name, he describes the affairs with candor and relish.

Involved in adventure when not in dalliance, Casanova lived by his wits, was by turn scholar, preacher, soldier, quack physician, manufacturer, musician, diplomat, poet, gambler, police spy, and librarian. His autobiography reveals much about manners and mores of eighteenth-century Europe, it also concerns a wealth of detail on medicine of the period.

The Life. Son of an actor and actress of Spanish descent, Casanova was born in Venice, April 2, 1725. Neglected by his parents, he was raised by a grandmother. He suffered from frequent epistaxis as a youth, probably had infected adenoids, his apathetic open-mouth expression led the family to think he was mentally retarded.

The *Mémoires* open on a note of illness. Wrote he: "Here is the first incident I can recall. I was standing in the corner of a bedroom, turned toward the wall with my head bent down and my eyes fixed on the blood that was trickling across the floor and flowing abundantly from my nose."

Suggesting adenoids in this passage: "I was very weak, without appetite, incapable of attending to anything, and wore an idiotic look. Doctors discussed the cause of my illness. 'He is losing,' they said, 'two pound of blood a week, and he can only have sixteen to eighteen.' One said that all my chyle was being turned into blood. Another maintained that the air I was breathing must at each respiration increase a portion of the blood in my lungs, and that it was for this reason that I always kept my mouth open."

A "Dr. Macop" recommended a change of air to thin the blood. Sent to Padua at age eight, Casanova showed remarkable improvement in health. Rapid physical and mental growth took place in the same period; he learned to read in a month, quickly emerged as a brilliant scholar.

Casanova wanted to study medicine but his family insisted on the priesthood. Forced to leave the University of Padua because of gambling debts at fifteen, he was expelled a year later from St. Cyprian Seminary at Venice for scandalous conduct.

Visiting every country in Europe, experiencing astonishing variations of good fortune and bad, he knew such notables as Frederick II of Prussia, Catherine the Great of Russia, King Stanislaus Poniatowski of Poland, Joseph II of Austria, Voltaire, Popes Benedict XII and Clement XIII. When he lacked a patron, and could not secure a convenient position, he supported himself by gambling and swindling. Among his dupes were Mme. de Pompadour and a famous fellow rogue, Allesandro Cagliostro.

A description of Casanova in his middle years is furnished by a Venetian police agent: "He is a man of lofty stature, of fine and vigorous aspect, with bright eyes and very brown skin. He wears a short, chestnut-colored peruke. I am told that his character is bold and disdainful, but especially that he is full of witty and well-instructed speech. He comes and goes where he will, with open face and haughty mien." Added Casanova's friend, Prince Charles de Ligne: "He would have been very handsome had he not been ugly."

The first crisis in Casanova's career came at thirty, when he was confined for more than a year in the hellish "Leads" prison of Venice for crimes including "contempt of sacred religion." Feigning illness to lull his guards, he secured a pike and bored

his way out through the roof. After a precarious descent from the rooftop, he broke into a ducal palace, escaped from there to the street. While police sought him everywhere, Casanova posed as a friend of a local chief of police, hid out in the chief's home while that official was away. He claimed that he nearly seduced the chief's wife in the bargaio.

Casanova's high point in fortunes was a luxurious post with the royal lottery of France; he lost the position when his seductions, forgeries, and assorted indiscretions taxed court tolerance to the breaking point. His low point was service as a "vice squad" spy for the Inquisition in Venice: to earn \$10 a week he submitted Peeping Tom reports on the morals of others. When dismissed from that job, he wrote a grovelling letter to the Inquisitors: "Full of confusion, overcome with shame, knowing myself to be absolutely unworthy of addressing my vile writings to Your Excellencies . . . I beseech Your Sovereign Munificence to allow me to keep on the post where I have been serving: I will work harder. So that I can live."

He often dabbled in medicine, usually in the form of outrageous quackery. When a count consulted him about sciatica, Casanova took saltpeter, sulfur, and mercury, mixed them with the patient's urine, then rubbed the concoction into the ailing thigh. Noted Casanova: "If one repeats a lie often enough, one ends up by believing it to be the truth."

He masqueraded as a gynecologist, cynically admitted that the "physician" frequently forgot his role with desirable patients. In one instance he cites a girl who was bled 104 times for amenorrhea; he claimed that he cured her by erotic excitement. He was interested also in psychologic disorders, maintaining that abstinence from sex was a cause of insanity.

Casanova as patient suffered at least eleven times from venereal disease. He submitted twice to mercury treatment, was depressed to the point of contemplating suicide after one mercury medication, thereafter relied on a less strenuous regimen of bed rest, baths, starvation diet. His arteries and nerves apparently were not affected.

He abstained from sexual activity when infected, but once inadvertently set off a gonorrhea epidemic that spread to fifty people

in the town of Orsera. Reported the physician at Orsera after Casanova departed: "For twenty years, I have practiced in this town where I lived in poverty, for I had only a few bleedings and cuppings to perform, and scratches and sprains to cure. My earnings were not enough to support me. But ever since last year I can say that my condition has changed. I have made much money and invested it wisely."

Casanova took a philosophic view of his venereal misbaps. In his later years he wrote: "I have often noticed that most of my life has been spent in trying to make myself ill, and when I had gained my end, in trying to recover my health. I have equally well succeeded in both these aims, and today when in this respect I enjoy perfect health I suffer from not being able to make myself ill, hut age, that cruel and inevitable disease, compels me to be well in spite of myself."

His other ills and traumas included indigestion and gout from gastronomic excess, severe piles acquired at the prison in Venice, a bullet wound from a duel in Poland. He refused to let surgeons amputate when his wounded arm became swollen and blue, and recovered through sheer vitality.

At 60, exhausted, exiled from many of the great cities he had known, the old rogue found safe harbor as librarian to Count Waldstein, at Dux, Bohemia. He wrote the *Mémoires* there, spent his last 13 years in unrepentantly lascivious reminiscence. At 69, he developed symptoms of an enlarged prostate; his death at 73 was probably due to septic absorption from this source. The repeated attacks of gonorrhea probably rendered his urinary passages a *locus minoris resistentiae*.

The Loves. All embracing was Casanova's pursuit of love. Notes one biographer: "He makes love in beds, in coaches, on staircases, in bathing establishments, and in the open. He makes love standing, sitting, lying down, with one girl, with two girls, with his niece, with his natural daughter, with former mistresses whom he meets again after 30 years, with a 10-year-old, with a 70-year-old, with prostitutes, with mother and daughter. When he doesn't make love, he speaks of love and reminisces about love and demands love and is full of love."

Casanova's success in love was due partly to vitality and charm,

partly to sheer persistence. He would storm, weep, lie, promise anything, threaten to kill himself if rejected; he wooed each new woman with whole-souled enthusiasm, then quickly forgot her to woo another.

His erotic techniques included boldness, swiftness, and cynicism in lovemaking; he saw to it that his reputation preceded him so that the women of each new town would await his coming with eager curiosity. He once summed up his romantic philosophy thus: a man should marry, seduce, buy, or kidnap the object of his desires but should obtain her at all costs.

His first heterosexual experience came at 9; it was an awkward, unconsummated affair with a 14-year-old girl. At 16, he had his first complete experience: made love to two sisters in the same bed.

Several women duped him, among them an English courtesan named La Charpillon. She accepted huge sums of money from Casanova, kept him at arm's length, consorted meanwhile with a lowly barber's apprentice. Furious when he found them in bed, Casanova caned the woman naked into the streets. Later he tried to make amends but she wisely avoided his violent ardor.

Obsession with sex bankrupted him when he set up a factory to produce printed silks. he hired twenty girls but shortly went broke because he neglected business to seduce his employees. On other occasions he combined love and business and lived off his paramours.

An incestuous affair involved his daughter by a former mistress. Casanova describes the lovemaking, then remarks: "We remained motionless, looking at each other seriously and silently, without changing position. As we later told each other, we were both amazed that we felt neither guilt nor repentance. Our tender kisses confirmed the new bond that united us."

Ironic was his last involvement with a woman. At 70, he entered into a long correspondence with a young girl of noble Austrian family. She poured out her heart to him, urged him to "Show me my errors if you blame my principles; the esteem I feel for you will lead me to change them."

Replied Casanova: "True love is that to which sensual enjoyment is unknown." To the girl's brother, he wrote: "I have in-

stilled into her the love of truth, moderation, submission, a noble pride, all the virtues made for her sex."

Psychology. A study by psychiatrists Sumner and Burrill Freedman viewed Casanova as a schizoid-manic type; they noted his great vanity as a dominant trait and added: "Jung might with some difficulty classify him as 'extrovert sensational' type. With one whose superego was so lax it is not easy to decide what characteristics are Ego and what are Id."

He can be classified also under Sheldon's ectomorphic body type; he was tall, slender, bony, with angular profile, a small, weak, hypoplastic mandible; features included olive skin and piercing eyes. Physiologic characteristics, especially his tallness, induced endocrinologist Gregorio Marañón to diagnose him morphologically as eunuchoid with weak sexual potency. Casanova might have compensated for sexual weakness by perfecting techniques of peripheral erotic stimulation, possibly invented tales of illegitimate children to hide his sterility.

Tending to confirm view of sexual inadequacy is the fact that women did not pursue Casanova when he loved and left them. Sexual frustration is suggested also in oral erotic stimulation which he seemed to derive from eating.

His personality probably developed as a defense mechanism against inferiority feelings acquired during an insecure, affection-starved childhood. He exhibited an overpowering drive to prove and reprove his freedom and superiority: He boasted in his *Mémoires* that "my greatest treasure is that I am my own master, and have no dread of misfortune." In another passage he writes: "I have loved women madly, but I have always preferred freedom even to them."

He was endowed with a restless libido, was able to apply enormous quantities of emotional energy to everything he attempted. His ability to maintain his nervous energy so long might be explained by the fact that he wasted little if any energy on worry, self-doubt, and internal conflict.

Other characteristics included exhibitionism, narcissism (he loved jewelry, fancy dress), and compulsions to travel, gamble, and defy the law. Travel provided him with a change of female

audience as well as scenery; gambling allowed him to assert his personality in audacious play.

Havelock Ellis saw Casanova as a normal man at odds with artificial rules of behavior. Wrote he: "Whatever offenses against social codes he may have committed, Casanova can scarcely be said to have sinned against natural laws. He was only abnormal because so natural a person within the gates of civilization is necessarily abnormal and at war with his environment. Far from being the victim of morbidities and perversities, Casanova presents to us the natural man in excelsis."

Adds Ellis: "Casanova has been described psychologically as an unstable type. This is to view him superficially. A man who adapts himself so readily and so effectively to any change in his environment only exhibits the instability which marks the most intensely vital organism. His mental organization was singularly harmonious. The most punctilious alienist could not commit Casanova to an asylum."

Casanova defended himself on similar grounds, projected his hedonistic view to the Deity. Wrote he: "Insane are those who imagine that the Almighty God can enjoy the sufferings, the pains, the fasts and abstinences which they offer to him as a sacrifice. . . . God can only demand from His creatures the practices of virtues the need of which He has sown in their soul, and all that He has given us has been intended for our happiness."

Summing Up. This is the unequalled history of a rake's progress. Lost to history are the memoirs of the women who loved him.

Dwellings and Medicine



The best security for civilization is the dwelling, and upon proper and becoming dwellings depends more than anything else the improvement of mankind.

—Benjamin Disraeli, 1874

Man first built a wall to shield his cave fire from the wind, gradually realized through prehistoric millennia that he had discovered a warm lighted shelter in which to cultivate the earliest arts of civilization. Ever since, the hearth has been the core of human culture, the house with its lighted window a potent symbol of security and welcome. *MD* pays tribute to the home with the story of man's dwellings.

Beginnings. Thousands of years before the cave dwellers, primitive human communities lived without shelter of any kind, roaming about for food during the day, huddling together in the open at night. Much later, the notion of shelter-building emerged in man's dim consciousness. Shelter, defense, and a nest in which to rear the young moved man to take refuge in caves, then fashion tents of skins, later to plaster mud and thatch on tent-like frames.

Stone Age lake dwellers built houses on piles over the water, some tropical peoples today build their houses in trees against the heavy rains. In hot lands even primitive huts have verandas for shade, in cold lands entrances are no wider than slits. Windowless

mud butts were homes for most of humanity until comparatively recently.

For mutual protection, men lived close together, either in clustered villages or by bousing many families in a single large dwelling. Stone Age remains comprise both types; the multi-family dwellings were rectangular or horseshoe in shape within a high surrounding wall. The long houses of Borneo hold forty or fifty families, the Samoans set their unmarried young men apart in large bachelor houses.

For building materials, man used anything available, from mud to ice; 5000-year-old sun-dried bricks have been found in the Tigris-Euphrates valley. The Romans built with oven-burned bricks laid behind stone or marble facings; the Byzantines used bricks in mosaic fashion for decoration.

City life added amenities and also class distinctions to dwellings, e.g., in ancient Egypt the poor buddled in mud butts, the "middle class" lived in one or two-story brick houses, with courtyards for cooking and eating and a flat roof for sleeping; the rich and powerful lived in sumptuous palaces. Unmatched by contemporary Pharaohs was the palace of King Minos of Crete: built between 1850 and 1400 B.C. (destroyed c. 1100 B.C.), it was a stupendous labyrinth of sophisticated art and domestic engineering, with plumbing and ventilating systems that were unequalled for 2000 years.

The urbanized Greeks brought water mains and sewers into their cities and lavished immortal art on their public buildings, but paid little attention to their homes. These were usually plain one-story structures; an undistinguished doorway opened from the street into a cramped hall, thence to an inner court on which the rooms faced. Modest facilities included charcoal braziers for warmth, a basin for bathing, occasionally an improvised shower arrangement.

Imperial Rome was a conglomeration of dark, noisome wooden tenements for the poor; brick shopkeepers' houses pressed wall to wall; fabulous residences for the rich. City water was piped into the fine houses, a wealthy patrician had his private bath and one or more inner courts with fountains, pools, gardens. He also had a library, several dining rooms, many bedrooms, work rooms, storage rooms, slave quarters, kitchens, and a bakery. The walls

sported opulent (frequently lascivious) murals, the floors were mosaic-paved, statues adorned the colonnaded courts.

Country villas were still more extravagant: in Hadrian's villa at Tivoli an entire suite of rooms formed an island in a pool. Patrician houses were heated by hot air from a huge oven, circulated through hollow tiles in the walls; the Romans were also the first to use glass panes in windows, though the windows themselves were few and small.

Baron and Burgher. Life in a medieval castle was communal: the drafty Great Hall served for cooking, dining, entertaining, as dormitory for the many retainers and any stray travelers. The lord and lady might have a private chamber; in some castles a private toilet was perched over the moat.

Equally communal was life in the burgher's town house: his workshop or counting house was part of his dwelling, his clerks and apprentices lived in his household. Activities centered in the common room warmed by the cooking fire; unglazed windows let in sun and air on fair days, were tightly shuttered against night and bad weather. Many facilities were also communal: bathing in the public baths, roasting meat in the town cookshop oven, urinating in the streets.

The burgeoning middle class of the Renaissance surrounded their houses with workshops and storage sheds, added third and fourth stories, let in light through paned windows. The enclosed court developed into open galleries giving access to the various rooms. Upper stories were built out over the street to the point of danger; James I of England finally banned these hazardous overhangs. Water was first piped into London houses in 1619.

As trade and industry replaced local wars and pillage, the great baronial castles changed to spacious manor houses set amid lawns and wooded parks. Specialized rooms emerged: kitchen, bakery, buttery, spicery, pantry, scullery, larders wet and dry, servants' quarters; bedrooms, guest rooms, "withdrawing" rooms, dining hall, chapel.

Elegance. London's last great fire in 1666 laid four-fifths of the city in ashes, cleared the way for an era of classicism and elegance: Christopher Wren built dwellings of comparatively functional simplicity, but he lived long enough (1632-1723) to see his work

scorned for a lavish revival of Italian Renaissance style, especially that of Andrea Palladio (1510-80). Palladian symmetry was carried to extremes, stairways were in pairs, one side of the house had to match the other even if they served totally unlike functions.

Writes architecture historian Ralph Dutton of this splendid age: "These famous houses were designed with entertainment as the principal end. Comfort was little studied, convenience not at all, and indeed it was unnecessary when armies of underpaid servants were easily available to clean, to scrub, to polish, to carry food swiftly from distant kitchens, to stoke innumerable blazing fires, to bring hot water, to light many lamps and often hundreds of candles." In Louis XIV's palace at Versailles, servants wheeled around commodes for the royal excretory functions, as no other toilets were provided.

The eighteenth century in England developed the quiet dignity of brick fronts, uncluttered light rooms, chaste furniture by Sheraton, Hepplewhite, and Chippendale; the Georgian style reflected the Age of Reason, remains to this day the most widely accepted period style in English and American dwellings.

American "Renaissance." The industrial nineteenth century's sooty air nurtured dirty slums on the workers' side of town and equally sombre Victorian mansions of the owners on the other. Its bastardly offshoot was the "neo-Gothic" style, a monstrous attempt to bring back the medieval style of dwelling. English and American builders enthusiastically adorned houses with towers, turrets, cupolas, verandas, and garden gazebos, hung them with swirls, swags, scallops, and curlicues of the jigsaw school of design, topped them with mansard roofs and ornate wrought iron railings, occasionally threw in a moat for good measure.

The so-called American Renaissance in architecture wobbled from "gingerbread" ornamentation to Oriental extravagance: circus magnate P. T. Barnum's minaretted "Iranistan" in Connecticut; painter Frederick E. Church's "Olana," in upstate New York, a Persian villa with mosaic brick walls, a gold-painted porch, and a red, green, and black slate roof. Romanesque and Renaissance palaces designed for the wealthy contained palm courts, Jacobean suites, Moorish rooms, Byzantine halls; they abounded in carved

and wrought iron balconies and balustrades, pink and green marble nymphs, and ornate friezes by the score.

Regarded as a model of the modern New York house (brownstone) was famed neurologist Dr. William Alexander Hammond's home on West 54th Street. The kitchen and service rooms were in the basement, meals had to be carried up a narrow flight of stairs to the dining room on the "parlor floor"; some houses boasted dumb waiters and a dining room pantry. Dr. Hammond's dining room was decorated with a Renaissance ceiling, its crimson and maroon leather walls were stamped with medieval chimeras in gold. Thus described by a contemporary admirer was Dr. Hammond's office:

"An Egyptian retreat, with the lotus, the scarabaeus, and the procession of slaves, huntsmen, and animals, the hawk-headed goddess, the dog-faced deities of Egypt, the inscrutable eye of the high priest as he presides over the fireplace. This room is devoted to consultations on the mysterious diseases of the brain, and is fitly dedicated to that subtle Egyptian intellect which saw so clearly behind the veil, and read as no other people have read, the enigma of life."

Rebels against this hyperornate Victorian idea of beauty retorted with the one-story California bungalows, ancestors of today's ranch houses, also Colonial saltbox houses, "Mission" and early American maple furniture. The veranda or "piazzas," wicker-furnished, glassed in, and heated, antedated today's terrace and garden living.

Heating. Wrote an English visitor in Virginia in 1607: "Their houses are so commonly placed under covert of trees, that the violence of fowle weather, snowe or raine cannot assault them, nor the sun in summer annoyne them, and the rooffe being covered . . . the winde is easily kept out, insomuch as they are warm as stoves, albeit very smoakey."

By the fifteenth century in Europe the hood projecting over the fire and the flue carrying smoke up through the wall became general in well-to-do dwellings. Poorer townsfolk in flimsy wood-and-thatch houses experimented disastrously with wooden chimneys, so did early New England settlers with similar combustible results.

Developments in firebrick and cast iron added to the safety and heating efficiency of the hearth; by the eighteenth century middle

class dwellings in town and country had a fireplace in every room. Benjamin Franklin improved on the fireplace with his cast-iron "stove," actually a fireplace or grate removed from the wall. Dutch tile stoves had been used in parts of Europe since the ninth century, in the nineteenth century cast-iron pot-bellied stoves became widely popular, were gradually replaced by central heating and the most recent built-in radiation systems; current architectural experiments are with solar heating devices.

Lighting. For centuries artificial illumination made no progress beyond the wick burning in grease or oil; the medieval rush light was still merely a rush dipped in oil, fixed in an iron clip; the first wax and tallow dips were little improvement. A hardening process for wax made possible the brilliant eighteenth century drawing rooms lit by hundreds of candles, also the elaboration of interiors with stairs, hallways, and many chambers. The mid-nineteenth century discovery of oil brought kerosene lamps to millions of homes; the town dweller by that time had the alternative of using carburetted hydrogen, i e., illuminating gas.

Electricity as light was first demonstrated in Sir Humphry Davy's arc lamp in 1802; Thomas Edison's practical incandescent light bulb in 1879 began the electrical era. A newer light source is the fluorescent lamp, newest is the mercury vapor lamp, fairly common commercially but not yet in household use. Cove lighting and other built-in forms marked the escape of home illumination from fixtures into architectural design, the trend continues with spot, flood, and other devices for indirect and diffuse lighting both in and out of doors; the trend is paralleled by glass-walled and many-windowed dwellings making the fullest use of natural light.

Ideal lighting avoids glare, sharp contrasts in brightness, glitter from glossy paint or metal surfaces; it provides focused or diffuse light, intense or low level illumination according to the need. Emphasized by Dr. M. Luckiesb and Dr. S. K. Guth, in pioneer investigations during the past decade, was the discomfort of incidental brightnesses intruding on the visual field; recent studies have established statistical indices for visual comfort. Standards of room illumination have risen in 25 years from five to ten foot candles to 100 to 200, with possible maxima up to 450; persons aged 50 years and over need about twice as much light as at age

20. Recommended today is 20 foot-candle light for casual reading, 30 for concentrated reading.

Water. With the famous exception of Crete's King Minos, even royalty apparently did not have water piped into houses until Roman times, but water closets with some kind of flushing device allegedly existed in Babylon and Nineveh. Modern water closet was invented in 1596 by Sir John Harrington; in eighteenth-century France, the interior dry privy was still an "English" novelty.

The communal water source was the town well, in cities often a handsome fountain; piping water into the city, in wooden or lead conduits, was a private operation either philanthropic or commercial. In the seventeenth century water was again piped into private, usually well-to-do, residences. A separate bathroom was common in wealthy medieval burgher houses in Germany, did not become a widely accepted amenity until the nineteenth century.

Bedroom. Until the Renaissance, beds were usually curtained off in an alcove of the common living room, children slept in trundle beds at the foot of the parental bed. Writes architect Lewis Mumford of this period:

"Privacy, mirrors, heated rooms: these things transformed full-blown love-making from a seasonal to a year-round occupation: another example of baroque regularity. In the heated room, the body need not cower under a blanket: visual erethism added to the effect of tactile stimuli: the pleasure of the naked body, symbolized by Titian and Rubens and Fragonard, was part of that dilation of the senses which accompanied the more generous dietary, the freer use of wines and strong liquors, the more extravagant dresses and perfumes of the period. Flirtation and courtship created those movements of suspense and uncertainty, of blandishment and withdrawal, that serve as safeguards against satiety; a counterpoise to the regimentation of habit. These lusty men and women were never so much at home as when they were in bed. Ladies received callers in bed; statesmen dictated their correspondence in bed; an undercurrent of erotic interest thus permeated the household, sometimes bawdy, sometimes brutal, sometimes romantic, sometimes tender—every shade from the bedroom of Juliet to that in which Joseph Andrews almost lost his virtue. The private needs of the bedroom even penetrated the garden: the summer house, the

temple of love, or the more aristocratic maze, composed of high box hedges: places remote from the prying eyes and admonitory footsteps of even the servants."

Bedroom seclusion has recently been invaded by modern architects, transformed with partitions and sliding doors into the "family room," new versions of the medieval common room; in one plan only the children's rooms have complete walls and doors. This trend runs contrary to the Mumford view: "Every part of the dwelling must be arranged equally with an eye to sexual privacy and untrammelled courtship. Private bedrooms alone are not enough; soundproof partitions are equally important and in communal units soundproof floors."

Health. In one English urban district in 1843 there were 33 toilets for more than 7000 inhabitants, in another 40,000 people lived in cellars, 60,000 in closed courts. Described by a contemporary was an average New York tenement in 1865:

"It is commonly a structure of rough brick standing upon a lot 25 x 100 feet; it is from 4 to 6 stories high, and is so divided internally as to contain 4 families on each floor—each family eating, drinking, sleeping, cooking, washing, and fighting in a room 8 feet x 10, and a bedroom 6 feet x 10; unless, indeed—which very frequently happens—the family renting these two rooms takes in another family to board, or sub-lets one room to one or even two other families."

Headed by Dr. Joseph M. Smith, Dr. Willard Parker and other New York physicians was a last century house-to-house investigation of slums; their report filled 17 volumes, listed as resulting from bad housing: typhus fever, tuberculosis, cholera infantum, dysentery, diarrheal diseases, various typhoid *maladies*; scrofulous, rheumatic, and eruptive diseases. The average rate of sickness in these areas was from three to ten times the rate in other areas of the city.

Physiology. A pioneer study of the physiology and psychology of housing was begun in 1937 by the American Public Health Association. Its Committee on the Hygiene of Housing uncovered the subtle cumulative effect on mental health of overcrowding, noise, petty irritations, e.g., a refrigerator door that opens the wrong way. Among the committee's recommendations:

Temperature should be 68° to 74° F. for normal household activities, 78° F. for lightly clothed persons at rest, 86° F. for the nude figure at rest. Air conditioning in summer should be adjusted according to outdoor temperatures to avoid too great contrast: at 95° F. outdoors, indoor temperature should be 80° F.; at 90° outdoors, 78° indoors; at 80° outdoors, 5 degrees cooler indoors.

Noise has adverse effects on bearing, respiration, blood pressure, digestive functions; psychologic effects are annoyance and a fear reaction; increased fatigue is both physical and psychologic. Most common noise complaints are neighbors' radios, conversation, children at play, doors banging, toilets flushing. In a British survey of 2000 families, one in four was bothered by noise in his own house, one in three to four by neighbors' noise, one in two by outdoor noise. Traffic flow of more than 10 cars per minute at 20 to 30 feet from the house is rated "excessively persistent intrusion"; recommended is ordinary traffic at 200 feet distance, trucks at 2000 feet.

Window construction should take account of solar strength, as should decoration and choice of colors according to their reflecting power. Ceilings should be lighter than walls, walls should have a reflecting factor of 50 per cent and a mat finish.

Criticized widely today is the American tendency to replace old overcrowded tenements with new ones, equally overcrowded. New American projects house between 300 and 450 persons per acre, compared with the British rate of 12 families (c. 50 persons) per acre; the core of such projects is not a neighborhood but an elevator shaft.

Sums up the American Public Health Association: "The home, if it is to be a setting for healthful living, must provide a physiological environment which regulates illumination, moisture, sound, temperature and ventilation and also, a social environment which promotes emotional security and insures privacy for the family and the individual."

Dwellings Tomorrow. Among the new trends in American dwellings are:

Orientation. Revolving houses to trap solar heat, sun, and daylight, also avoid sun when desired. Houses situated to take best advantage of climate, terrain, prevailing breezes.

Construction. Prefabricated parts, rather than complete houses, will allow a choice of roofs, e g, one with independent support to permit brick or glass for house walls. Steel or laminated plywood are among new roof materials; aluminum, molded plastic for other parts of the house.

Design The "family room" combines cooking, dining, living areas. Conversely, the bedroom-sitting room (or study combination) insures individual privacy. A return to the classic inner court (*atrium*) would solve the conflict between outdoor living and neighborly privacy.

Summing Up. Emerson once ranked a comfortable home as one of the three greatest sources of happiness. Every advance in science and technology seems to alter man's ideal of a cozy dwelling

Tale of the Tub



*He who bathes in May will soon be laid
in clay;*

*He who bathes in June will sing a merry
tune;*

He who bathes in July will dance like a fly
—Old English Rhyme

The simple bathroom of today is the product of three thousand years of not-so-simple social history, in which bathing ran the gamut of human mores from mysticism to prostitution

For the American buyers of some two million bathtubs per year, at an average outlay of about \$250 million, the bath may be a mere necessity. For the physician it is an implement that has been intimately connected throughout history with the medical profession. For the curious, MD here takes a dip into the pool of bathing tradition.

Early Bath. First baths of which records exist had mystic significance of protection from inimical spirits, purification of guilt or sin. Pharaohs and priests of ancient Egypt bathed before prayers and sacrifices. Hindu pilgrims still bathe in the sacred Ganges River; in ancient days pilgrims bathed in the Nile, Jordan, Euphrates, Po. Mosaic law decreed bathing after sexual intercourse, menstruation, or contact with a menstruating woman; a bride after her wedding night had to bathe nude, removing even

her wedding ring. Moslem law requires bathing on numerous occasions, includes the prenuptial bath common to many cultures.

From ritual to healing was a short step: pre-Christian Celts worshipped wells and springs, whether medicinal or not, bathed in the waters, left offerings to the deities. They immersed rachitic children in cold springs on special days sacred to sun worship. Some pagan wells later acquired Christian patron saints, e.g., St. Winifred's, noted for curing sterility in women.

Classic Bath. To bathe and anoint the body with scented oils after a battle, journey, or other exertion was routine to the Greeks. They had soap made by boiling goat's tallow and beech ashes but favored oil for the bath. A Greek gentleman on a journey carried a personal oil flask in his toilet kit, cleansed his skin with an iron or silver scraper.

Wealthy Greeks had private baths installed in the houses. Mythology had Ulysses and Diomedes taking a warm bath; while Agamemnon was taking a bath Clytemnestra took an axe, gave her husband a couple of whacks, with expected results.

Public baths were immensely popular, many of them elaborate structures of marble, glass, or bronze. Women thronged to these baths, partly for matchmaking reasons. Wrote a nineteenth-century commentator:

"Here the matrons who had sons to marry studied the form and character of young ladies who frequented the baths; and as all defects both of person and features were necessarily revealed it was next to impossible for any lady . . . to retain for any length of time an undeserved celebrity for beauty."

In ancient Rome, men, women, emperors, and groups of common soldiers bathed together in the *thermae*, models of sumptuous bathing that followed the Romans into barbarian lands.

The principle of the Roman bath was hot air: the bather passed through progressively warmer chambers (*tepidarium*, *calidarium*), ended with a cold douche or dip in a pool (*frigidarium*). A dressing room (*apodyterium*) had locker-like niches where bathers left their togas. Some baths were additionally furnished with an *unctuarium* where the client was anointed, a court for athletic workouts, stadium, auditorium for lectures and poetry readings, gardens for strolling, meditation, gossip, or dalliance. A bath excavated at

Leptis Magna in Africa has a large colonnaded marble swimming pool. Sculpture enhanced the bathers' esthetic enjoyment, e.g., the famed Laocoön in the baths of Caracalla. Built-in were underground service passages for slaves, conduits for water, heating chambers for fires under the stone floors.

In the early days of Rome, men and women were strictly segregated in the public baths, but with luxury came laxity. The Emperor Domitian allowed mixed bathing, Marcus Aurelius banned it; so did Hadrian and Trajan, but Heliogabalus restored it to its old-time profligacy. People drank wine while bathing, alternated baths with sumptuous meals, frequently spending the entire day at the baths. In the provincial and seaside baths (e.g., Puteoli, Baiae) were held orgies of drinking, gambling, obscenity, and (says a prudish observer) "immoralities that can only be hinted at."

Wealthy patricians had private baths, as in the villa of Diomed in Pompeii. Excavated in Rome are the public baths of Titus (A.D. 81), Caracalla (A.D. 217), and Diocletian (A.D. 302). Historic irony is that Christian slaves built Diocletian's baths, were put to death when their task was finished.

Social Bath. Bathing fell into disfavor, baths into ruin with early church asceticism. Decreed the Rule of St. Benedict, c. 529, "The use of baths shall be offered to the sick as often as it is necessary; to the healthy, and especially to youths, it shall not be so readily conceded." St. Gregory, pope from 590 to 604, recommended baths, but on Sunday only and specifically for hygiene, not enjoyment. Monastic bathing was cold, private, and taken only at Christmas, Easter, and the Virgin's Nativity.

Sudden revival of bathing in the twelfth century and its subsequent giddy vogue of some four centuries is credited by some to Charlemagne (742-814) who rediscovered the beneficial waters of Aix-la-Chapelle, erected a royal hot bath on his palace grounds, invited his court, including the rough soldiers of the palace guard, into the bath with him. Returning Crusaders brought reports of luxurious Arab bathing customs, no doubt speeded up the slow-spreading hot bath fever.

Public baths sprang up at sites of the ancient *thermae* in Italy and elsewhere in Europe, with them arose exuberant, not to say

indecorous, practices that led to a series of ecclesiastic and civil decrees aimed at maintaining the proprieties.

The supposedly unbathed flower of chivalry were in fact enthusiastic bathers: English noblemen installed private baths in their houses, Scottish lairds had them in their castles, throughout medieval Europe maidens waited on the knights in their baths. Ladies entertained in boudoir baths wearing only their jewels, in warm weather they bathed outdoors in garden pools with little screening.

Common people bathed naked together with a rail separating the sexes; at spas, e.g., Bath in England, the gentry bathed with hats on. Canvas gowns and special bath hats were fashionable accessories. Food and drink on floating tables, concerts, conversation, chaffing with spectators in the gallery were among the pleasures of the public bath. Ladies kept handkerchiefs and personal toiletries beside them in floating bowls, music-loving bathers played their lutes and harps in the water. Floating filth, garbage, the sharing of body scourings and infections, especially venereal disease, apparently did not trouble the bathers.

Charming Renaissance custom at the Baden baths was noted by Italian visitor Poggio Bracciolini in 1416:

"The women have a custom of playfully begging from the men who come to see them bathe. The latter throw down small pieces of money, which they direct to the fairer damsels."

Added an English observer at the same baths 200 years later:

"Men and women bathing themselves together naked from the middle upward in one bath, whereof some of the women were wives (as I was told) and the men partly bachelors and partly married men, but not the husbands of the same women."

Russian steam baths, Turkish hot-air baths also spread westward, became the notorious "hothouses" or "stewhouses" of London. To the Roman system of heated rooms, perpetuated in the Arab world, the Turks had added vigorous skilled massage, called "shampooing." Arab ladies also enjoyed hairdressing, manicures, music, social life on their specified bath days. Travelers found the Turkish bath in high favor throughout the Middle East, imported it to Europe under the Arabic name of *hummum* or the Italian *bagno*.

From Henry II's reign (1154-89), kings and Parliament were kept busy regulating the London stews (actually licensed brothels) until Henry VIII finally closed them in the sixteenth century. Public bathing generally declined; the custom of wearing hody linen, i.e., underwear, began in the same century, appeared to many to make hathing for cleanliness unnecessary.

Bagnios flourished again in London as resorts for pleasure-seekers and profligates. Commented French playwright and courtier Pierre de Beaumarchais, "*More money is exhausted during one night in the taverns and bagnios of London, than would maintain all the seven United Provinces for six months.*" One rich youth from the country, in London for his first visit, went straight to a bagnio, remained there eleven days and nights without setting foot outside, bought champagne for his female guests to wash their feet in, refusing to pay the 1200 guinea bill.

Far more decorous were Japanese public haths, now numbering many hundreds in the cities, offering ordinary citizens cleanliness, comfort, and company, of which many avail themselves regularly after the working day. The Japanese home bath is traditionally a round wooden tub, not necessarily secluded, filled by hand with hot water; guests, family, servants bathe in that order, gentlemen first, all in the same water. Japanese bathe not to wash their bodies hut, exclaims a Japanese author, "*to wash their life!*" Bathing is the supreme pleasure indispensable for the Japanese."

Private Bath. Benjamin Franklin sat in his tub in his Paris lodging, soothing his aged arthritic joints while entertaining ladies of Marie Antoinette's court; as soon as he got home he devised an American, i.e., automatic, improvement on the French tub with a built-in heater to keep the water hot, thus dispensing with a platoon of chambermaids bearing boiling kettles.

Private baths were at first far from private. The tub as a piece of home furniture originated in medieval times as a small, shallow oval, functional for a seated bather. It was enlarged not for the bather to lie down hut for a second bather to get in; a tray across the tub enabled a lady and her gallant to bathe and dine together.

The French added elegant refinements: a canopy, decorative and also useful to keep off drafts, keep in heat; a boot-shaped bath, the *sabot*, in which the bather's head alone was exposed to

guests; a high sofa-like padded back, also a *chaise longue* bath in which the bather could recline gracefully à la Mme. Récamier. Depth increased, sides rose, the high back vanished, as did devices for concealing the bather's nudity; Pauline Bonaparte conducted her famous houdoir salons sitting in a modern-looking tub with upright sides and curved interior; she embarrassed her Emperor brother, when asked whether it was not shocking to receive male callers nude, by replying: "The room was heated!"

The White House acquired its first bathroom in 1851 in the tenancy of President Millard Fillmore, but only in the teeth of shocked opposition to this "English innovation" as a corruption of American democratic simplicity. The free enterprise slogan of "Cleanliness is good business" stimulated soap, plumbing, and related industries, developed the American bathroom as an essential to living standards and an astonishment to the world.

The hazards of bathing have dwindled with grab rails (recommended are L-shaped bars), wide flat-bottomed instead of curved tubs (some have skid-proof wrinkled bottom), a smooth front wall flush with the floor. The thick enamel surface is smooth to the bare skin, does not absorb germs and dirt. Some models have 12-inch instead of the standard 17-inch sides for the safety of children and elderly bathers; one plumbing company dreamed up a split-level bath with one side of the tub at normal height, the other at nearly table height for bathing baby. Many models have wide aprons or built-in seats. Thermostats and diverter valves control the temperature and pressure of the water; shower doors are made of plastic instead of glass.

Statistically the bathroom today is the safest room in the house, with falls in tubs and showers constituting only 2 to 3 per cent of the total home accidents; in one life insurance analysis of 663 fatal home accidents, only two were falls in the bathtub. Electrocution from flipping light or appliance switches while wet is also a danger; in a well-planned bathroom, light switches are out of reach of the tub or shower.

Bath Psychophysiology. Psychologic and physiologic effects of the bath are interrelated: warm baths traditionally advised for "nervousness" are effective, says a modern psychiatrist: "not only because they give pleasurable stimulation to skin eroticism and

represent atonement but also because they create a peripheral vasodilation, and thus work counter to the central tension all neurotics suffer from."

For non-neurotics the warm bath is also pleasurable, creates peripheral vasodilatation, withdraws blood supply from brain and internal organs, thus inducing relaxation. Baths at body heat and above cause temporary sterility in males by raising the temperature of the testes, though they stimulate sexual appetite. A really hot bath raises the body temperature and induces sweating, it stimulates rather than relaxes. A cold bath causes peripheral vasoconstriction, a quick cold immersion brings a reaction of vasodilatation and tingling warmth.

Believed by some psychoanalysts is that the deeply rooted ancient symbolism of washing away sin and guilt leads to the release of emotional tension: "undoing" a preceding "dirtying" action, either real or imaginary. Resulting euphoria may be the cause of the well-known urge to sing in the tub or shower.

Summing Up. Baths have flowed with man throughout the centuries, providing him with ritual meaning, social jollity, sensuous titillation, medicinal aid, and, more recently, prosaic hygiene.

Seat of Civilization



The chair is today the symbol of modern sedentary culture, yet in the history of civilization it played a curiously minor role in everyday living.

While Americans are now estimated to spend 90 per cent of their waking hours on a chair of some sort, their progenitors might spend a lifetime without ever sitting on one.

Authority. The chair was for millennia a symbol of authority and dignity reserved for royal or priestly rank. It was carried with the personage wherever he went: in ancient Egypt it was a folding chair, x-shaped (*curule*), carved with animal or human forms, and almost always richly adorned.

The Greeks had a grand chair of authority (*thronos*) as well as lesser chairs of graceful design. The Romans reserved the *curule* for magistrates and for use on public occasions; they were made of marble ornamented with *sphinxes*, also of metal, wood, and ivory. Notable is that the Romans hardly ever sat on chairs: business was conducted standing (as in the Senate), at home the couch was the normal article for relaxation.

The Byzantines took a fancy to the *curule*, decorated it with winged victories and lions' heads. One of the most distinguished of the few ancient chairs is that reputed to be St. Peter's in the

basilica in Rome; it has ivory carvings depicting the labors of Hercules.

In medieval times a chair was massively built of heavy oak, with a lofty back capped by a tester or canopy. It stood on a dais or was perched so high that its lordly owner needed a ladder to climb into it. Its height allowed the occupant to see over a standing throng, protected him from drafts and aspiring assassins.

A medieval household ordinarily possessed but one chair, the master's; it might have two seats if his lady shared his rank and authority; some lordly houses provided a second chair for a distinguished guest. Others at the manorial table sat on chests in which they kept their belongings, or on plain wooden benches. One variant of the wainscot (panel-back) chair was the settle, a box whose lid was the seat, with paneled back and arms; settles were frequently fixed in pairs to the walls flanking the great fireplace. An early form of convertible furniture was the wainscot chair-table, in which the chair's high back was hinged to fold forward on the arms and act as a table top.

Fashion. By the seventeenth century, the chair had swelled in girth and was padded out with cushions to offer an adequate setting for gentlemen in wide brocaded coats and ladies with puffed skirts. A century later, the arms, which until then were a prolongation of the legs, were set back to make room for milady's yard-wide panniers and milord's whaleboned coat skirts. The dandy then had his "conversation chair" in which he could sit backward with elegant coat skirts draped over the chair's front; the lady of the salon had her *chaise longue*. There were special chairs for hair-dressing, powdering, even for watching card games. As corseting was relaxed, chairs were built lower and more comfortable, seats widened, chair backs changed to flat and curved forms: Chippendale chairs reflected this trend toward comfort.

Etiquette. A rule established by France's Henry III in 1582 was that at court, besides his own chair and the queen's, a score or so of stools were provided for high-ranking ladies and gentlemen who were allowed to sit in the royal presence. Etiquette rules became so intricate that a lady carrying her personal cushion into a room had to know whether her comparative rank allowed her to place it in an armchair, on a chair with a back but no arms, or a

stool without arms or back (*taboret*), and whether this should be upholstered or plain.

A sly evasion of etiquette was afforded by the straw-hottomed chair, originally a piece of kitchen and monastery furniture: this appeared at Versailles palace in the seventeenth century, gained immediate favor for its comfort and lack of rank; whoever sat in it first could generally keep it. Further inroads on chair etiquette came with the eighteenth century's flowering of graceful, light-weight chairs (Hepplewhite, Sheraton) for dining and drawing rooms. A mortal blow was struck at the chair's solemn dignity in 1759 when the French Academy replaced its *fauteuils* with *cabriolets*: "little boudoir chairs ordinarily found in the apartments of girls." From then on the chair's symbolism of rank lived on only in the designation of a chairman's seat of authority.

Occupational. Some physicians became concerned with the physiology of sitting during the industrial boom of the late nineteenth century; they warned that a poor sitting posture would produce venous congestion, cold feet, myopia, constipation, hemorrhoids, poor respiration, even pulmonary tuberculosis. Wrote one early medical authority: "If one has no opportunity of leaning against anything and cannot rest one's arms on a table or other such support, one very soon sinks down into oneself like a 'heap of misery.'" This investigator's conclusion was that man is not made for sitting during any length of time.

Controversial questions were: do the ischial tuberosities, being rounded, provide a broad enough base for balance without support before or behind; should a back rest be high, at the level of the thoracic vertebrae, or low in the lumbar region; should lordosis be straightened out or left alone. Advocates of the upright position recommended a hack support at the deepest point of the spinal curvature, projecting forward over the back edge of the seat. To keep knee and hip joints bent as little as possible, alternate suggestions were a forward-sloping seat, a saddle-shaped seat, a higher-than-normal seat; the aim was to make sitting resemble standing as much as possible. Said one: an upholstered seat would get too warm; said another. sitting with crossed legs was an improvement because the trunk would then be supported by abdominal pressure on the thighs.

Noted another nineteenth-century expert: "After the soles of the feet and the sides of the hands, the skin of the 'sitting protuberances' of the pelvis is best adapted to tolerate weight bearing. But nevertheless the weight must be removed from this region quite frequently. For this reason one often quite unconsciously places the whole weight of the body on one buttock, so as to be able after a while to shift it to the other."

A pioneer in industrial fatigue and time-motion studies was Frank Gilbreth who studied the chair height in relation to work surface height; he urged arm rests, possibly a head rest, certainly foot rests. Wrote he in 1919: "If every manager were made to sit for a certain number of hours today with his feet banging, there would be an enormous increase in the number of foot rests in our industrial plants tomorrow morning." Among his lasting innovations was a high chair for work done either sitting or standing, with a foot rest fixed either to the chair or to the work table.

An oft-quoted definition of correct sitting posture was given in a German study of 1929: "A position of equilibrium of the body in which it rests on the ischial tuberosities and can tilt forwards and backwards around them as an axis. The gravity line of the whole body falls between the ischial tuberosities. . . . The back is held straight, not by any special tension in the muscles, but by the natural disposition of the weight, especially that of the shoulder region. The muscles of the lower limbs are completely relaxed, only a small amount of muscular work is required to restore the balance of the body when it is disturbed. The feet, resting on the foot-rest, act as struts. However this position is less often seen in the office or workshop than are the other two incorrect positions." Both the "incorrect" positions (one bolt upright with increased lordosis, the other *slumped forward*) are now regarded as healthier, affording natural relaxation and rest for the dorsal muscles.

Some revolutionary principles proclaimed in the 1920's were that the chair's height should be adjusted to the occupant, the table height then adjusted to the chair, instead of vice versa.

Modern office "posture chairs" generally fulfill the basic requirements for seat design and back support; cushioning has replaced more rigid surfaces, is self-adjusting to individual needs. Poorly served for many years were women workers, whose shorter aver-

age height and leg length made them uncomfortable in chairs based on male averages; today's seat and backrest heights are often adjustable. The most recent refinement is the executive's chair with a built-in motor that massages the back.

Psychiatrists (particularly psychoanalysts) are probably the most sedentary workers in the medical world, are notably plagued by chair problems. A study of muscular disabilities of these specialists, resulting from their inactivity, is being conducted by *Dr. Mary O'Neil Hawkins and Dr. Hans Kraus*. Many psychiatrists prefer an easy chair with ottoman, firm and not too deep; women physicians find that easy chairs are built for the average male, seats are too deep for female hip-to-knee measurements. One of *Dr. Kraus'* recommendations to physicians who are obliged to sit for long hours is not only to change position frequently but to provide themselves with a change of chairs.

Medical. One of the earliest medical chairs was the eighteenth century "tranquilizer" for mental patients, sturdily built of wood, with ankle clamps, straps for wrists, arms, and chest, and a projecting rigid hood half enclosing the head. From the ancient "birthing stool" developed the parturition chair, first with a simple semi-circular back in one piece, by the nineteenth century it had a sloping back, ankle clamps.

Specialized chairs for medical use developed rapidly in the latter half of the nineteenth century: they provided adjustable head and foot rests, tipping mechanisms to position the patient for examination and surgery; leveled to a horizontal plane, the chair became an examining table.

The American inventor of the dental chair was the peripatetic orthodontist Josiah Flagg, about 1790 he gave up traveling, fitted his permanent Boston office with a Windsor chair to which he fixed an adjustable leather head rest with horsehair padding, drawers under the arm rests and under the seat. An 1887 dental chair already has a pedestal base containing a foot-pedal mechanism for raising and lowering the patient.

A "barber chair" of the early nineteenth century was an article of home furniture, apparently developed from a corner chair with a low back on which the client could rest his head while being

shaved. The barber shop's growing popularity in due course evolved the familiar barber chair.

The wheelchair, of uncertain origin but long pedigree, has undergone several refinements: a light-weight collapsible model for automobiles, "squeezer" devices to narrow the chair by as much as five inches for passage through doorways.

Some chairs in hospital rooms now sport an adjustable back cushion, higher seats and less backward slope for ease in sitting down and rising.

A therapeutic chair developed with the aid of medical consultants is the Barcalounger: about 15 per cent of these adjustable lounge chairs sold are bought on prescription. Among the ailments for which they are prescribed are arthritis, varicosities, cardiac disease.

Of paramedical interest is the electric chair, the invention of America's Dr. Alphonso D. Rockwell. Strongly opposed to capital punishment, and a leading authority on electrotherapeutics, he devised what he considered a more humane form of execution than hanging. With assisting physicians Drs. MacDonald and Laudy, the chair was developed in Thomas Edison's New Jersey laboratory. The authorities, unable to persuade reputable manufacturers to build the apparatus, hired an electrician; result was that the first execution was badly bungled. Dr. Rockwell subsequently redesigned the electrodes and restated his instructions; the chair has been little altered since.

Oddities. The *chaise percée*, aristocratic antique version of a child's potty chair, was an essential piece of French court furniture for some 500 years. Also called the "chair of affairs," "chair of retreat," it was often trimmed with felt, leather, cloth, or velvet, gilded and decorated with paintings usually by the hand of the court painter. Versailles in Louis XIV's time boasted 274 of these chairs, the great king's own was in velvet with damask and velvet cushions, was also fitted with a drawer.

The *chaise volante* or "flying chair" was a seventeenth century version of the elevator, a chair in a cage within the wall, raised and lowered by counterweights.

The sedan chair was the fashionable mode of transportation for persons of quality through eighteenth century city streets; it had

a hinged door, side windows, a roof that could be opened if the occupant preferred to stand, was carried by private lackeys or public chairmen.

The rocking chair is a homely American contribution to sedentary comfort. Its origin is obscure, Benjamin Franklin is credited by some with its invention; it may have originated with the custom of converting an outgrown cradle to a child's chair by upending it and attaching the rockers to one end; such antique children's chairs exist. An Amish and Pennsylvania Dutch version was a rocking chair for two, a boxed bed for the infant beside a seat for the mother, mounted on a pair of rockers. The Shaker sect of Boston manufactured rocking chairs primarily for invalids and the aged.

The swivel chair, mainstay of modern office furniture, has a history of some 400 years; a collector's item in its American version is a Windsor chair with a writing arm.

The three-legged chair, said to be the oldest American type, was already an antique 200 years ago when Horace Walpole, English author and collector, asked a friend to look for some "ancient wooden triangular chairs;" a distinguished example still extant is the Harvard Chair in which university presidents are supposed to have sat when awarding degrees.

Chairs Today. Whereas formerly a cabinet maker with some wood and a few tools had enough to make a chair, today engineering, architecture, sculpture, new materials and techniques are all required to supply the sedentary article.

Stated by designer Charles Eames, originator with Mrs. Eames of the molded plywood chair, is the new approach to chair making: "We've always been aware of not even attempting to solve the problem of how people *should* sit, but of rather arbitrarily accepting the way people *do* sit. . . . We really knocked ourselves out on the technical aspects—the bonding agents, the impregnation of veneers, integral finishes, high-frequency curing, shock mounts, compounding of rubber, induction welding." Molded wire, upholstered wire, molded plastic chairs followed; the current Eames design is a cast aluminum swivel stretched-fabric chair, the fabric being held under tension without stitching or glue.

A chair in a wire cage is compared by its designer (sculptor Harry Bertola) to a cellular structure: "This chair has a lot of

little diamond shapes and they all add up to one very large diamond shape, and this is the shape of the whole chair. It is a really organic principle. . . . These chairs are mostly made of air. Space passes right through them." Other new plastic designs are a pedestal chair like a cocktail glass by Finnish designer Eero Saarinen, a plastic seat and arms in one piece by American designer George Nelson. Modern version of the ancient *curule* is the durable Barcelona chair designed by architect Mies Van der Rohe in 1929.

The Model-T of modern chair design is the chair made of four giant hairpins and a sling like a four-leaf clover, called the Hardoy chair. Its descent was recently traced to a sportsman's folding camp chair used in the early 1900's by Theodore Roosevelt; it became a favorite with circus clowns, later with Italian officers during Mussolini's Ethiopian campaign. The original, made of ten sticks of wood and a canvas sling, was patented by an otherwise obscure British civil engineer in 1877. Since 1950 some five million of the modern metal model are estimated to have been sold in the United States alone, plus uncounted backyard versions produced by do-it-yourself welders.

Summing Up. Whether as symbol of authority or as an article of furniture, the chair remains one of the oddest and most original inventions produced by man.

The Holiday and the Holy Day (*Editorial*)



Joy to the world. Christmas bells are tolling, announcing the arrival of the King of Kings. Once again the miracle unfolds. Rosy flesh trembles on the golden straw in the bumble manger, bemisted by the breath of ox and mule. Christmas cards depict snowclad hamlets beneath star-spangled skies, fleeting sleighs with tinkling bells, tables groaning under the weight of brown roasts, golden bread loaves, steaming puddings, casks of cider and spiced punch, recalling memories of the season as immortalized by Charles Dickens, that gay, benevolent dictator of Christmas. In every corner, like a formidable challenge to the Atomic Age, Santa Claus shakes with laughter, the jolly snow of his beard spilling down his scarlet-clothed paunch. Shops brim with festive wares; man's soul, with renewed childhood.

Town and village glitter in their gorgeous Christmas wrapping; yet, is this very glitter impairing the warmth innate to the season? Is there too much scenery and not enough performance? Christmas conserves its original prestige as a religious and pagan homage to God and to the gods, since it combines the four most popular human activities: eating, drinking, merry-making, and praying; but for many people it has become merely a *holiday* instead of a *holy* day.

Christmas is a children's holiday, and children are the kings of tomorrow. It is a homage to the mystery of man's origin, so important to the physician, in which every child becomes a King and every adult a Wise Man. In these times of drastic surgery and cauterization, children are constantly receiving a lesson in facts. Christmas affords them the opportunity to step through the lighted window of legend into the world of myth. And myths are the purest rain with which to water the garden of a child's soul. Were parents aware of this, they would never put away the Christmas tree with the tinsel and the cotton and the crystal bells, and the house would never be free from the fragrance of pine needles.

But children will always have a Christmas tree. Should there be no room for a Christmas tree in the rigid geometry of the atomic cities of tomorrow, it will suffice to take children out on the terrace carpeted with the silvery petals of snow and let them gaze upon the night sky. And there they shall behold the most wondrous of all Christmas trees, glittering with millions of celestial stars.

For adults, Christmas revives the old conflict between the two most powerful human instincts: to walk the open road in quest of adventure; and to retire to one's cave to enjoy its warm comfort. These two instincts for the cave and the road have always clashed in man's mind. At Christmas the instinct of the cave wins. Man gathers around him those he loves, turns night into day with festive lights and roaring fires, and challenges winter's scarcity of food with lavish abundance. Crushing for a few days the roaming instinct that has taken him, yesterday by stagecoach, today by stratocruiser, to the confines of the earth, he is content to remain behind his frosted windowpanes, while the logs crackle in the hearth, the table sparkles with fine damask and cut glass, and fair ladies as resplendent as a morning in May smile upon him. Thus the unconscious primeval archetype of the cave wins at Christmas-time over the unconscious archetype of the road.

These psychological motives inherent in Christmas and its influence upon the mind can cause the depressive episodes known as Christmas neuroses. Modern Christmas inherited the holly from the Roman Saturnalia, the mistletoe from the Druids, the ivy from the Saxons, the Santa Claus myth from the Germans, and the manger from the Latins; but its basic substratum is a universal

myth of death and resurrection, depression and joy, the year's and Nature's death agony, and the new year's and Nature's rebirth in spring.

The proximity of the new year renders us conscious at Christmas of the passage of Time, and we then realize that it is not Time that changes but we ourselves. Man created the calendar and the clock—cages of Time—to establish his own biological rhythms and deliver himself from those of Nature. But all he achieved when he imprisoned Time—Time that is Tyranny—was to imprison himself behind the crossbars of the calendar and the clock's hands. Christmas' greatest gift to man is the opportunity it affords him to escape his clock- and calendar-regimented world through the magic fourth dimension of legend.

The true poetry of a physician's soul is his devotion to the mystery of Life and of the human being, whose best guardian he is. Christmas affords him the chance to get close to that mystery and to offer man not myrrh—a symbol of Medicine—as one of the Wise Men, a physician, offered the Child Jesus, but words of peace and happiness. Words—the “country doctor's” gospel—to perform his work without covetousness or fear, secure in the knowledge that in work lies the secret of man's strength and fortitude; to oppose the relativity of Time and Space with the eternity of Being; to halance the insecurity of environment with the greatest security there is, that of a confident mind and a stout heart; to accept that to love, to work, to dream, and to wait is man's destiny; to live *deeply* instead of fast and take roots so that he may bear fruit; to learn, as Pindar counseled, to be what he is, otherwise he shall be nothing.

How can these principles be applied? By reviving the symbolic message of the original Christmas in all its simplicity—greatness is simplicity—that legendary Christmas that Mother, Father, and Child spent in a stable warmed only by love and the breath of a mule and an ox. That Christmas that was not a holiday, but a *holy* day.

Christmas Medicine



*I say the curl'd drops soft and slow,
Come hovering o'er the place's head,
Off ring their whitest sheets of snow
To furnish the fair Infant's head*
—Richard Crashaw *Hymn of the Nativity*

Over a century ago, Charles Dickens wished that the spirit of kindness and benevolence engendered at Christmas time might last the whole year through. Many physicians who see the somatic harm done by feelings of hospitality and uncharitableness might well wish the same.

There should be little doubt in the medical mind that the minor gastrointestinal upsets of Yuletide overindulgence are amply offset by the psychosomatic benefits of good cheer, family jollity, suspended rivalries, refurbished friendship, generosity, heightened awareness of human ties. *MD* presents this theory unsupported by any statistical data.

Thus the medicinal value of Christmas must be concealed in a complex prescription of rites and rituals, compounded of medieval beliefs and satellite-age nostrums, the whole ingested around December 25 to the accompaniment of carols and jingling bells. In a spirit of benevolent inquiry, *MD* here offers clues to some of the ingredients in the Christmas formula.

The Day. The year of Christ's birth is uncertainly placed be-

tween B.C. 8 and 4; the day is even more uncertain. Common belief among early Christians was that He was born on the twenty-fifth day of the month, but the months included March to December. About the middle of the fourth century, the Church of Rome finally fixed on December 25 for the Nativity; His baptism and the visitation of the Magi (Epiphany) were fixed on January 6, the Twelfth Night.

In the Matthew Gospel (chap. 2) the wise men from the East tell Herod that they have seen the star of the King of the Jews, later the same constellation "went before them, till it came and stood over where the young child was."

The Nativity star has intrigued churchmen and astronomers ever since. Astrologers of the period recorded a remarkable conjunction of planets around November in 747 A.U.C. (*Anno Urbis Condita*) which would make it 7 B.C. Another theory is that there may have been a periodic visit of Halley's comet. Astronomer Johannes Kepler, after observing a *nova* in 1604, thought the Star of Bethlehem might have been such a star.

Choice of December 25 as the Nativity date by early Christian leaders was no mere happenstance, it coincided with festive days throughout the Mediterranean and European regions: the Roman *Saturnalia* (sometimes called Feast of Topseyturveydom), *Sigillaria* (Feast of Dolls), *Brunalia* (Sun's Birthday), and *Juvenalia* (festival of Youth); the Jewish *Hanukkah* (Feast of Lights) instituted in 165 B.C. by Judas Maccabaeus; the ancient Mithraic birthday of the sun god coinciding with the winter solstice; the Yule feast of the returning sun among the pagan Britons, Saxons, and Norsemen. As Christianity gradually embraced the whole region between Byzantium and Ireland, so the festival of Christmas engulfed a multitude of non-Christian festive traditions.

From the time December 25 was chosen, the Christian Church kept up a cautious, though usually unsuccessful, fight against the introduction of pagan customs into Christmas celebrations. Around A.D. 200 Tertullian denounced the use of Christmas evergreens, but by the sixth century, Pope Gregory I was advising his prelates to permit such harmless popular customs as could be given a Christian interpretation.

Evergreens. Easily the most pagan of all customs at Christmas

is the use of holly, ivy, and mistletoe. Ivy was the crown of Bacchus; holly was also used in the Saturnalia, later came to symbolize Christ's crown of thorns (the berries being blood drops). In medieval folk songs, holly was male and ivy female, the two of them constantly in rivalry. Another belief was that holly represented the burning bush from which Jehovah spoke to Moses. In many European countries, holly was an antidote to witches and gohlins.

The parasitic mistletoe (genus *Phoradendron* in the U.S.) is the Golden Bough which enabled Vergil's Aeneas to visit hell; the Romans regarded it as a symbol of hope and peace. The Celtic Druids called it "all-heal" and used it as a specific for every disease and an antidote against all poisons. In the seventeenth century, English and Dutch physicians prescribed it for epilepsy.

Where the genial custom of kissing under the mistletoe came from is pure guesswork. Norsemen deemed the plant so sacred that if enemies met under it in the forest they maintained a truce until the following day. Some folklorists associate it with primitive marriage rites. Curious fact is that the osculatory custom is confined to Anglo-Saxon countries.

The Tree. One Christmas Eve in the eighth century, an English missionary monk named Winfrid cut down an oak used by German pagans for human sacrifices; a young fir tree appeared miraculously nearby, and the monk (later St. Boniface) chose it as an emblem of Christianity. This tale of the origin of the Christmas tree is as valid as any favored by folklorists.

Fact is that the Christmas tree originated in Germany, believed by popular tradition to have been introduced by Martin Luther. Earliest mention of it as a Christmas custom is in 1605; it made little progress for the next two centuries. Finland adopted it around 1800; the first Christmas tree in England was reputedly put up in 1829 by the German Princess Lieven. Prince Albert mounted one in Windsor Castle in 1841, after which its popularity was assured. The first decorated spruce in the United States is ascribed to one August Imgard of Wooster, Ohio, in 1847, a wondrous sight that brought neighbors flocking.

The tree had lights on it in Luther's time, though when it was made to bear gifts is doubtful. America's contribution to the

tradition was the custom of setting up lighted municipal Christmas trees, later taken over by commercial centers, still later broadened by lighted trees on householders' front lawns. Some twenty million are now sold annually. In England and America electric lights are the rule, in Germany tradition clings to candles. Since the last war, spangled Christmas trees have even invaded Tokyo's Ginza.

Santa Claus. Once upon a time in the fourth century there was a kindhearted Bishop of Myra (between Rhodes and Cyprus) who loved to give poor people gifts but hated to be thanked for them. In due course he became St. Nicholas, patron saint of seafarers, children, merchants, travelers, and purveyors of anonymous presents. The early Dutch settlers in New York celebrated his feast day (December 6) with gifts for children. Sometime in the eighteenth century he (now named Santa Claus) was introduced into England as the secret dispenser of Christmas gifts.

The early nineteenth-century American Santa Claus had no special physiognomy or garb, sometimes wearing long clerical robes, at other times fur-trimmed jackets. Cartoonist Thomas Nast first popularized him in *Harper's Weekly* as the jolly rotund figure of today.

The earlier custom of dressing father as Santa Claus is dying out in favor of the department store Santas. Latter have become part-time professionals (mostly unemployed actors) at an average rate of three dollars an hour for a forty-hour week (time and a half on Saturdays).

At Macy's department store in Manhattan, about twelve thousand children a day come to confide their Christmas wishes to a relay of bearded Santas.

Curious phenomenon in the postwar years is the extension of Santa's popularity in other countries. In Italy, the red-robed gentleman is gaining on *Befana*, the traditional Italian good Christmas witch (equivalent to the Russian *Babushka*). In Latin America, children now expect gifts on December 25 and January 6, with Santas and Christmas trees under the fierce summer sun. Japan now features *Santa Sans*, usually curvaceous girls. One establishment advertised "Santa Claus" hostesses in scanty swim-suits.

The Feast. Christmas feasting is probably a combination of all the winery-dinery of the various pagan feast days incorporated

into Christmas in the course of centuries. Earliest English ceremonial dish was the boar's head mentioned at a royal Christmas banquet in 1170. The Wyken de Worde carol of 1521 sang:

*Be glad, lords, both more or less,
For this hath ordained our steward
To cheer you all this Christmass,
The Boar's Head with mustard.*

The Duke of Northumberland's *Household Book* of 1512 mentions five swans served up for Christmas Day; another favorite dish was peacock, its beak holding a sponge saturated with blazing spirit. The turkey first appeared as Christmas fare in 1524; the husband was popular until the eighteenth century. At Richard II's (1367-1400) Christmas feast, ten thousand guests gorged for several days on twenty-eight oxen, three hundred sheep, and innumerable pieces of game and fowl.

The Christmas pudding still popular in England began life as frumenty, a concoction of stewed wheat, milk, raisins, sugar, and spices. Odds and ends were gradually added to it until it became "plum porridge" and later (c. seventeenth century) coagulated into plum pudding.

In 1770, Sir Henry Grey served up a Christmas pie that contained 2 bushels of flour, 20 lb. of butter, 4 geese, and 2 turkeys, plus rabbits, ducks, woodcocks, partridges, blackbirds, and pigeons; it was 9 feet in circumference and weighed 168 lb. Today's traditional mince pie is a modest descendant of such heroic ancestors, though the anti-Christian Puritans had earlier dubbed it "a hodge-podge of superstition, Popery, the devil and all its works."

Wassail. The English have (or recently had) their Christmas punch, Americans their eggnog; neither can be traced back to the Wassail Bowl of Saxon yuletide feasts. One recipe asked for boiled ale, beaten eggs, roasted apples, sugar, nutmeg, clove, and ginger, brewed and drunk hot. Says a Bacchanalian ditty still heard in some parts of England:

*Wassail, wassail all over the town!
Our toast it is white, our ale it is brown.*

In pre-Puritan England, the Wassail Bowl was filled and quaffed generously during most of the twelve days of Christmas. It was a noble vessel; the one still to be seen at Oxford University holds nearly ten gallons, with a half-pint ladle.

Gifts. Some historians trace the tradition of gift-giving at Christmas to the Roman custom of giving *strenae* on New Year's Day; theologians believe it symbolizes the gifts brought to the infant Jesus by the Magi. In Christian times, the custom had its ups and downs; in many Catholic countries the exchange of Christmas presents among betrothed was at one time strictly limited; the Puritans banned Christmas gifts (and Christmas) by Act of Parliament in 1644; in the 1830's a great hullabaloo was raised when a Catholic prelate forbade Christmas presents among relatives or young betrothed; in Victorian England the exchange of gifts between a man and a girl usually implied a matrimonial understanding.

The custom in the United States is now a major factor in industry and commerce, with an estimated yuletide expenditure of \$18 billion. Of this the *Wall Street Journal* recently estimated that one billion dollars would be spent by American business concerns in Christmas gifts to employees, representatives, and past or prospective customers. Puzzling gifts sent by one business firm were miniature bara-kiri swords imported from Japan.

Psychiatrists view with a jaundiced eye the still prevalent custom of linking Christmas gifts to children to their good behavior, with or without the connivance of Santa Claus. They argue that this postulates a cowardly form of bargaining on the part of the parents, engenders deceitfulness and hostility in the child. The tradition was upheld quite recently in the popular Christmas lament:

*I'm gettin' nuttin' for Christmas,
'Cause I ain't been nuttin' but bad.*

As for gift exchanges among adults, these may be an expression of the "kindness and benevolence" mentioned by Dickens, or they may represent unconscious attempts to assuage guilt feelings for the unfriendliness manifested during the rest of the year; or they may be an attempt to "buy" some affection in the coming year.

Whatever the dark motive, the custom shows no sign of dying out

Christmas Cards The origin of the relatively modern custom of sending Christmas cards is sometimes ascribed to the English Royal Academy artist W C T Dobson, who in 1845 sent friends lithographed copies of a sketch he had made to symbolize the Christmas spirit. Or it may have been a fellow academician J C Horsley who designed one for Sir Henry Cole in 1846. The first English printed cards were very simple: a cock robin, a sprig of holly or mistletoe, plus a conventional greeting. Pioneers of Christmas card printing in the United States were mostly Germans such as Louis Prang who opened shop in Roxbury, Mass., in 1874.

Since then, Christmas cards have portrayed every possible theme, including the fairly recent innovation of whimsy bawdiness. The expensiveness of a card is considered a gauge of the sender's affluence and the recipient's social ranking ('Send a cheap one to Cousin Flo'). Churchmen decry the use of secular themes, psychiatrists view the acquisition of a mound of cards as an attempt to bolster an insecure popularity. Meanwhile, manufacturers and retailers take in an annual \$150 million, and the US Post Office profits by \$50 million in postage. And for the commercial record, the "world's largest Christmas card" was erected by a Chicago merchant firm, featuring the Holy Family twelve stories high, illuminated by enough kilowatts to light 260 homes for a month.

Puritan Hostility. The notion that Christmas celebrations were the work of the devil originated in the Reformed Church circles in Scotland in the sixteenth century. Its leaders (Knox, Melville) damned the Romanized Church and all its works including ecclesiastical festivals not mentioned in the New Testament. In 1583, the Glasgow Kirk Session put five persons to public penance for celebrating "the superstitious day called Yule." Contrariwise, Puritan William Prynne in 1633 had his ears cut off for denouncing (among other amusements) Christmas festivities. In 1656 Puritan Hezekiah Woodward published a tract with the remarkable title 'Christmas Day, the old Heathens' Feasting Day in honour to Saturn their Idol God, the Papists' Massing Day, The Superstitious Man's Idol Day, The Multitude's Idle Day, Satan's That Adversary's Working Day.' Taking to heart the Heathenish customs, Popish superstitions, ranting fashions, fearful provocations, horrible

minds city dwellers of dells and forests, tree lights brighten dingy streets or dreary countrysides, music breaks through the normally depressing or jangling auditory stimuli. The choice and preparation of gifts is a stimulant for the imagination; the emotion of surprise stirs sluggish endocrine glands. For all except unfortunate neurotics, Christmas is the one day of the year that is most richly anticipated, most exuberantly enjoyed. Wrote Charles Dickens: "Who can be insensible to the outpourings of good feelings, and the honest interchange of affectionate attachment which abound at this season of the year? A Christmas family party. We know nothing in nature more delightful! There seems a magic in the very name of Christmas. Petty jealousies and discords are forgotten; social feelings are awakened in bosoms to which they have long been strangers. . . . Kindly hearts that have yearned toward each other, but have been withheld by false notions of pride and self-dignity, are again reunited, and all is kindness and benevolence! Would that Christmas lasted the whole year through (as it ought), and that the prejudices and passions which deform our better nature were never called into action among those to whom they should ever be strangers!"